

# Mining

## CONGRESS JOURNAL



SEPTEMBER  
1949



## EXIDE-IRONCLAD BATTERIES

DEPENDABLE, LONG-LASTING POWER FOR MINE  
LOCOMOTIVES, SHUTTLE CARS AND TRAMMERS

**SAFE  
DEPENDABLE  
POWER**



They're DIFFERENT!... in design, construction, service qualities. The major difference is the exclusive positive plate which combines with other features to make Exide-Ironclad the outstanding battery for mine motive-power service.

Exide-Ironclad Batteries have ALL FOUR of the essential characteristics that a storage battery must have to assure maximum performance from mine locomotives, trammers and shuttle cars—high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these Exide-Ironclad characteristics assures years of day-in, day-out service with dependability and economy.

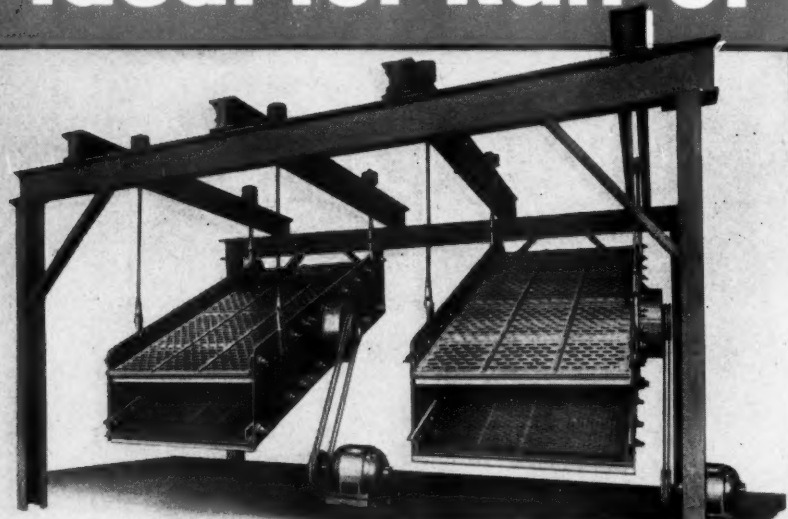
"Exide-Ironclad" Reg. Trade-mark U. S. Pat. Off.

**888...DEPENDABLE BATTERIES FOR 61 YEARS...1949**

**THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32**

*Exide Batteries of Canada, Limited, Toronto*

# Ideal for Run-of-Mine also



## **LINK-BELT** **CA** VIBRATING SCREENS make efficient separation on a 10° incline

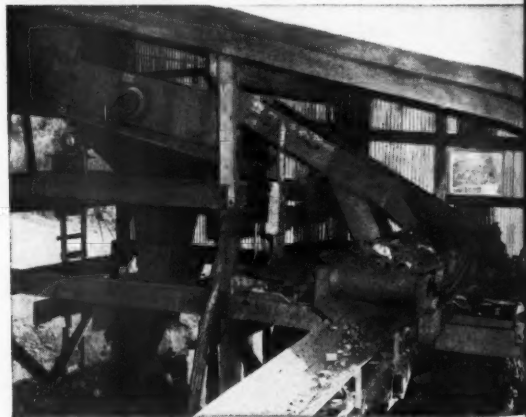
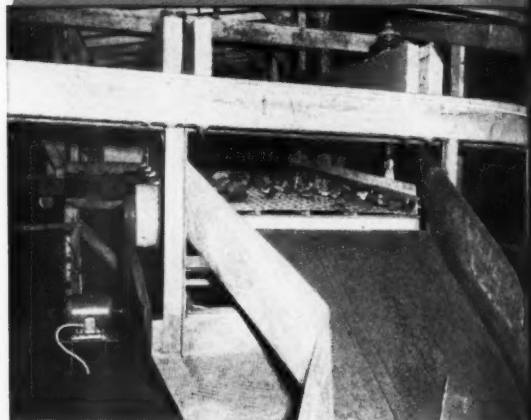
The Link-Belt Concentric Action vibrating screen is making a name for itself in "scalping" operations on run-of-mine coal, as well as in stoker coal sizing in preparation plants. The center picture at the right shows a typical run-of-mine operation: a Link-Belt "CA" screen making a separation at about  $2\frac{3}{4}$ ", operating on an incline of 10 degrees, at a West Virginia mine. The other photograph shows a similar West Virginia operation.

The two-bearing vibrator of the Link-Belt "CA" screen is located near the center of gravity and imparts a smooth, positive, circular motion to all screening surfaces. Automatic centrifugally actuated counterweights eliminate objectional vibrations usually encountered through "critical" speed ranges in accelerating and decelerating screens having fixed counterweights and large amplitudes of vibration. High starting torques are substantially reduced by the Link-Belt automatic counterweight mechanism. For details send for Book 2154.

### **LINK-BELT COMPANY**

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Denver 2,  
Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, Birmingham 3,  
St. Louis 1, Seattle 4, Toronto 8.

At left: dual double-deck "CA" cable suspended vibrating screen with typical steel supporting structure.



11,438

**COAL PREPARATION AND HANDLING EQUIPMENT**

**Engineered  
and Built by**



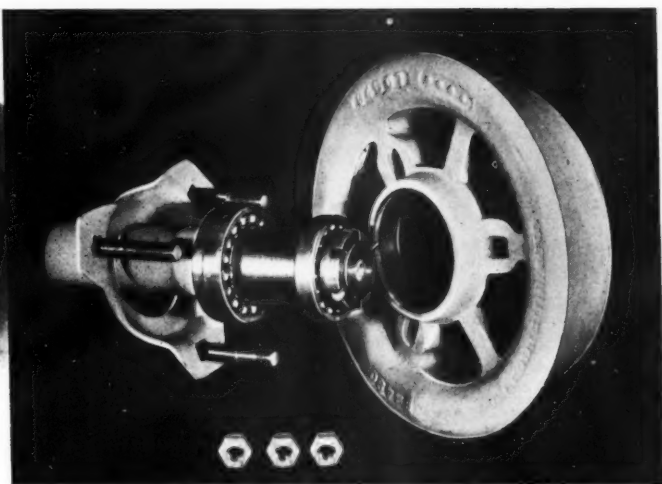
**LINK-BELT**



are "FLOATERS"

# Demountable?

**YES!...and in less time than it takes to smoke a cigarette...**



Here's the mine car wheel that you demount as easy as changing the wheel on your automobile. Remove three nuts, slip the S-D "Floater" wheel off, and the bearings remain in perfect adjustment on the axle. When a wheel needs replacing, you want it done *now*—in a hurry. Changing a "Floater" is so quick and simple that it doesn't even require an experienced mechanic. Because of precision fit and closed hub, grease leakage is eliminated to a point where the "Floater" requires fewer greasings than any mine car wheel made. The "Floater" principle of one set of bearings locked and one set which "floats" automatically into perfect adjustment, reduces bearing replacements to a minimum because pinching, out-of-alignment, loose or tight bearings are impossible. When it comes to performance, there is no equal to "Floaters." Independent engineers' tests have proved that up to 50 per cent greater tonnage may be hauled with no increase in power consumed in cars having "Floater" wheels as compared to other types of precision bearings. Write today for Wheel Folder No. 7105.

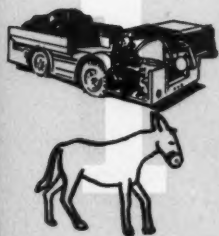
*20 Car loads of "Automatics" from—*



**SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.**

# How 6 Mines Profit by HEAVY-MEDIA SEPARATION

## PITTSBURGH SEAM



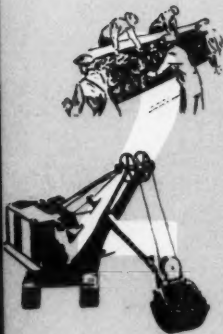
**SHIPS LOW-ASH PREMIUM  
FUEL FROM MIXTURE  
OF MECHANIZED AND  
HAND-MINED FEED**

Two mines feed 700 tons a day to the preparation plant of this progressive operator. One is completely mechanized for full-seam mining; the other uses hand loading and mule haulage.

Mixed feed from these mines runs 15.5% ash . . . 3.8% sulphur. To keep competitive, this operator installed a Heavy-Media Separation unit with a seven-foot cone. Run-of-mine mixture first passes over picking belts from which approximately 200 tons a day of lump coal are taken.

Approximately 400 tons a day in the  $2\frac{1}{4}$ " x  $\frac{1}{4}$ " size range are cleaned by Heavy-Media Separation at 1.60 gravity with a recovery of 90%. (There is practically no "float" in the "sink".) Ash content now averages 6.5%. The Heavy-Media Separation unit has shown very excellent rejection of refuse, which often includes massive pyrite and slabby material.

## LOWER KITTANING SEAM



**ECONOMICALLY CLEANS  
MIXTURE FROM STRIP AND  
DRIFT MINES. ELIMINATES  
PICKING . . . HALVES ASH**

Medium-volatile bituminous raw coal comes from a drift mine and a strip operation on the Lower Kittanning Seam. Feed averages 13% ash; is contaminated by the binder at the center of the seam and laminates at the top. Hand picking costs were high; quality and output were hard to maintain.

So the owners investigated Heavy-Media Separation; decided that the savings on six pickers (released for other work) justified a 70 tons-per-hour plant.

Now pickers are a memory. One man operates the Heavy-Media Separation unit which easily cleans 700 tons of  $2\frac{1}{2}$ " x  $\frac{1}{4}$ " a day at 1.45 gravity, recovering 92.7% coal analyzing only 7.46% ash, 1.43% sulphur and having 13,700 B.t.u.

## PITTSBURGH NO. 8 SEAM



**CLEANS FLUCTUATING  
RAW FEED EFFICIENTLY  
AT 100% ABOVE  
RATED CAPACITY**

Customer requirements for the  $1\frac{1}{4}$ " x  $\frac{5}{8}$ " coal call for 7% or 7½% ash according to end use. Wide variations in feed rate of this size occasionally occur resulting in fluctuating volume of refuse to be removed by cleaning equipment. The Heavy-Media Separation unit installed to clean this size handles the changes in feed rate automatically and without loss of cleaning efficiency. No special precautions are necessary to prevent loss of clean coal when feed rate drops.

This operating plant amply confirms our oft repeated contention that "Heavy-Media Separation can cope with large fluctuations in refuse-content without loss of volumetric or cleaning efficiency."



#### ILLINOIS NO. 6 SEAM

### **SPEEDY INSTALLATION OF HEAVY-MEDIA PLANT KEEPS STRIP MINE WORKING PROFITABLY**

The owners foresaw that prompt improvement in quality was imperative at this Illinois property in order to meet increasing competition. So they investigated Heavy-Media Separation: placed an order for immediate delivery of a "prefabricated plant." Within a few weeks components of a 40 tons-per-hour Heavy-Media Separation unit were arriving on the site. In less than three months the Cyanamid Field Engineer assigned to tune up the installation reported:

"This operator says he is now delivering the lowest-ash coal being shipped by any mine on the #6 Illinois Seam. Output in the 4" x 1/2" size range at 1.47 specific gravity separation runs under 7 1/4% ash; has a 13,000 B.t.u. He's no longer worried about the 'buyers' market' in coal."

#### PITTSBURGH SEAM

### **INCREASES RAW-FEED CAPACITY 22%. RECOVERS 50% MARKETABLE COAL FROM REFUSE**

The existing cleaning plant of this prominent coal producer was re-circulating middlings to maintain grade. By adding a supplementary Heavy-Media Separation plant to clean this middling, raw feed to the existing plant was increased 22%. The Heavy-Media Separation unit cleans 250 tons an hour in the 3" x 1/4" range containing refuse from 40% to 70% (averaging 50%). This supplementary unit recovers up to 125 tons per hour of marketable coal; has been so satisfactory that the operator has installed a second Heavy-Media Separation unit to treat approximately 250 tons per hour of 7" x 3" raw feed which was previously hand-picked.

#### EAGLE SEAM

### **SPEEDY CLEANING BY HEAVY-MEDIA SEPARATION PRODUCES 3.5% ASH COAL WITH 4% MOISTURE**

We told this operator that Heavy-Media Separation cleans coal *fast*. Tests on his new plant show "marked" lumps on the clean coal screen 6 to 10 seconds after they hit the cone. That's fast cleaning . . . explains why a 7-foot cone can handle up to 75 tons per hour of the 2" x 3/16" fraction and produce extremely low ash, low moisture coal.

Cyanamid offers a complete range of Separation Processes by Specific Gravity Difference (Heavy-Media Separation and the Dutch State Mines Cyclone Separator) for new cleaning plants or as adjuncts to present washers. Prefabricated Heavy-Media plants with capacities up to 125 tons per hour are available for prompt delivery and speedy erection. Larger Heavy-Media units can be quickly designed through the accumulated experience of several well-known engineering firms.

With no self-interest in equipment manufacture or plant construction, Cyanamid can give you sound counsel based on unprejudiced tests in the Cyanamid Mineral Dressing Laboratory and Pilot Plant at Stamford, Conn. We will also cooperate with engineers of your choice on plant design and provide a Cyanamid Field Engineer to tune-up your Heavy-Media or Cyclone Separator unit.



**AMERICAN** *Cyanamid* **COMPANY**

**MINERAL DRESSING DIVISION**

30 ROCKEFELLER PLAZA



NEW YORK 20, NEW YORK

# *unmatched* for drilling speed and power



Blast hole drilling with CP-55 Diamond Drill

With no increase in over-all weight — 160 pounds — the easy-handling, CP-55 DIAMOND DRILL is 25% more powerful than the famous CP-5 — thanks to a newly designed rotary air motor. It's economical, too — with minimum air consumption per foot drilled.

Conservatively rated at 500 feet with E-EX fittings. Designed for both coring and non-coring operations. Blast hole couplings supplied when desired.

*Write for Bulletin 318.*



**CHICAGO PNEUMATIC  
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES  
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*Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress*

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## THE AMERICAN MINING CONGRESS

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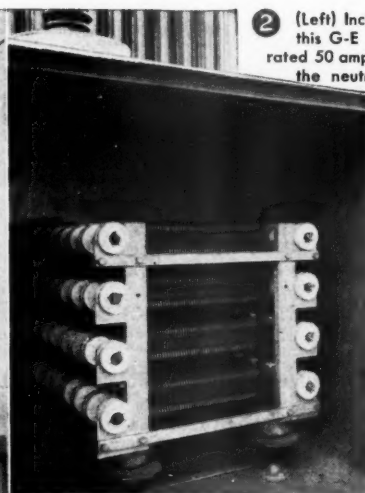
Member Audit Bureau of Circulations

# "We're sold on it!"

**"THAT'S WHY WE'RE  
INSTALLING THE SAME  
SETUP IN ANOTHER STRIP MINE."**

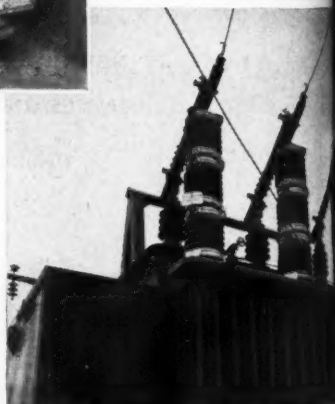


**1** (Left) Here is the Harmattan Mine's G-E outdoor-type, skid-mounted unit substation, rated 1500 kva, which steps down incoming power from 33,000 to 4160 volts. Because the G-E power distribution system keeps the voltage drop to a minimum, the equipment can operate farther from the substation, thus resulting in less frequent moving of the substation.



**2** (Left) Included in the unit substation is this G-E Type EW grounding resistor, rated 50 amperes continuous, for grounding the neutral of a 4160-volt circuit. It eliminates the hazard of high-voltage shocks resulting from undetected shorts.

**3** (Below) Installed on the 33 kv incoming line of the unit substation, these 3 sets of G-E Thyrite station-type lightning arresters are each rated 34.5 kv. Compact and of simple design, these G-E arresters have a record of excellent protective efficiency in preventing system disturbances or outages.



**GENERAL**



**ELECTRIC**

662-2



**Complete General Electric power distribution system helps minimize shutdowns, reduces delays and accidents, cuts costs, says Mr. L. E. Briscoe, Electrical Engineer of Fairview Collieries.**

At the new coal-stripping operation of the Fairview Collieries Corporation at the Harmattan Mine near Danville, Illinois, a complete, co-ordinated General Electric power distribution system was recently installed, comprising unit substation, cable, and cable-skid switch houses. As a result, according to Mr. L. E. Briscoe, electrical engineer in charge, "We are sold on this type of power distribution system and are installing the same setup in another strip mine that we are modernizing."

Let Mr. Briscoe explain why:

"A dependable power distribution system," he says, "helps keep shutdowns to a minimum, which is the key to successful dragline operation. By using cables instead of overhead lines, power lines can be kept out of the way and advance with the operating equipment. This eliminates many accidents and delays, and provides big savings in money."

"The flexibility of our G-E system is due to (1) use of standardized equipment, (2) use of polarized couplers which permits interchanging cables, and (3) the ease and speed with which the cables can be interchanged."

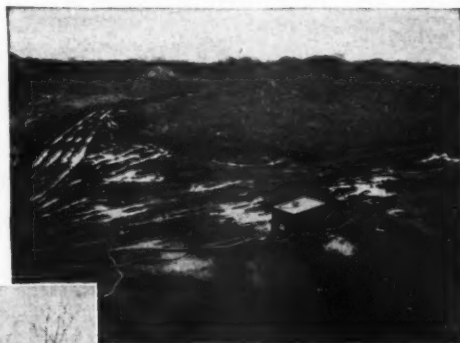
"The G-E power distribution system also provides for testing ground continuity of each 4160-volt incoming and outgoing cable on the hill-type cable skids. This assures that the ground protection system is always working, does away with testing the cables by bells or other methods, and saves us valuable time."

Advantages such as these—plus additional savings in power costs and relocating time and costs—can be yours with a completely integrated G-E power distribution "package." It's worth your while to check the facts with a G-E mining specialist. Call him—today. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*



4 (Above) The Harmattan Mine uses 9 of these G-E portable, cable-skid switch houses to serve its surface mining equipment. They provide maximum portability and convenience plus more selective tripping. For safety, the G-E system is designed to have at least two protective breakers between each piece of operating equipment and the unit substation.

5 (Below) This interior view of one of Harmattan's hill-type cable-skid switch houses shows the power circuit breakers, rated 25,000 kva interrupting capacity, 3 phase, 60 cycle, 5 kv maximum; together with a 6-volt battery and a G-E Type SB-1 switch for testing ground continuity.

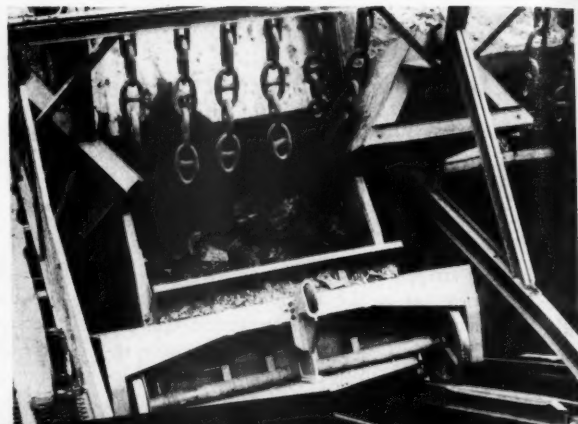


6 (Above) G-E cable-skid switch houses are metal-enclosed and sturdily built to provide maximum service continuity under conditions such as shown here. At Harmattan, G-E portable cable—all of the same type for easy interchangeability—is used exclusively.

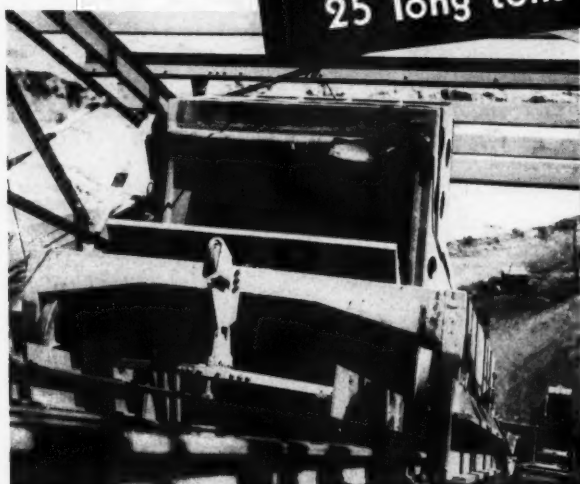


**Power Distribution  
Systems**

**—to cut mining costs  
per ton!**



25 long tons at 1,200 f.p.m.



**25 Long Ton Pay Load at 1200 f.p.m.**  
**with NATIONAL IRON COMPANY'S ROCKOVER SKIPS**  
*The economical method for handling materials.*

This improved method for handling all types of material, from sand to boulders and all kinds of coal or ore, from any depth of pit has proven fast and economical.

Its outstanding feature is the balanced Rockover Skip carried by a three-point suspension chassis, on trunnions at the center of the load, so that the chassis never leaves the straight track for dumping and the hoisting cable always pulls straight without

deflection. The skip is dumped by positive guides at the end of its travel.

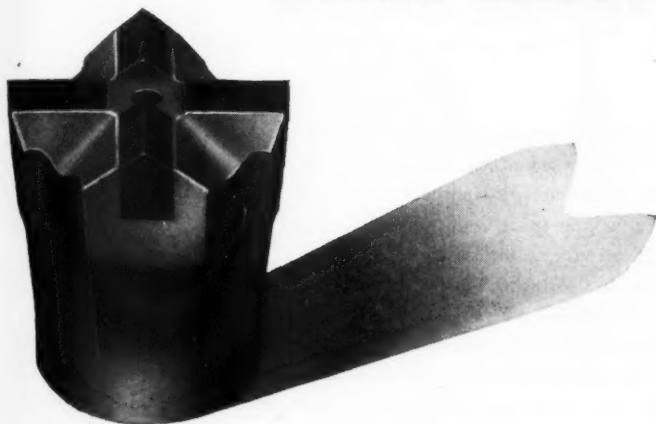
The balanced skips each carry a full truckload of any size material. The upper skip dumps automatically without positioning while the lower skip is being spotted for loading. The loading pocket is easily disassembled and set up in a lower position as the skip way is lengthened. The track is 10 feet wide, laid on the pitwall at any angle, according to standard track laying practices.

Write for illustrated bulletin describing this interesting **NEW METHOD** of open pit mining procedure.

**NATIONAL IRON COMPANY**  
 RAMSEY STREET AT 50TH AVENUE WEST • CALUMET 4865 • DULUTH 7, MINNESOTA

# Carset Jackbits

**Drill faster, 50% or more**  
**Boost tonnage 20% or better**  
**Finish more rounds per month!**



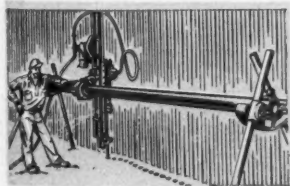
## HERE ARE A FEW TYPICAL REPORTS ON CARSET PERFORMANCE



**A MINING COMPANY**, drilling in a very hard quartzite, reports that CARSET JACKBITS have so multiplied drilling speed that miners can now drill and blast on the same shift. With steel bits, blasting previously had to be done on the second shift. This customer has converted to CARSET JACKBITS 100%.



**ON A LARGE DAM PROJECT**, 2" CARSET JACKBITS were used with 4" Wagon drills operating in hard dense basalt. These bits drilled 24-ft. holes in 22 minutes, while steel bits previously used required 66 minutes for an 18-ft. hole (with 10 bit changes). Footage was increased from 120 to 261 ft. per shift.



**IN A GRANITE QUARRY**, CARSET JACKBITS have given such outstanding performance that steel bits are no longer used. Previously, with quick-dulling steel bits, the bit reconditioning shop had to be run two 8-hour shifts a day. This operation has now been almost eliminated.



**A MINING COMPANY**, in driving a 12 x 20 foot 97-hole heading in taconite, required an average of 49.8 hours to pull a 5-foot round. With CARSET JACKBITS they pulled 6 1/2-foot rounds and cut this time to 18.5 hours. Accurate cost records showed a direct saving of \$92.69 per foot of drift, or \$602.48 per round.

**Now it has been Proved that you can do this, and much more, with the I-R CARSET JACKBIT**

More than two years of actual field experience have given positive proof of what the CARSET JACKBIT can do — under all drilling conditions, in all kinds of rock. The results today are creating a complete revolution in rock-drilling performance and economy.

For here is a Carboloy-set bit that is repeatedly out-drilling and out-lasting a steel bit usage by 50-to-1, 100-to-1, and in many cases as much as 400-to-1! Uniformly high drilling speed is maintained for the full depth of the hole — without the progressive slackening in speed of quick-dulling steel bits. Bit changing is practically eliminated, longer steel changes can be used, and single-gauge holes can be drilled to any practical depth. This means more efficient drilling cycles, more rock or ore broken per shift — usually 20% or more.

For the complete story on the CARSET JACKBIT, write today for your copy of our new 36-page, pocket-size catalog, Form 4091.



manufactured exclusively by

**Ingersoll-Rand**  
 11 BROADWAY, NEW YORK 4, N. Y.

409-15



# 575 Tons an Hour 24 Hours a Day



For two years this Cummins-Powered Model 1201 Lima shovel worked 24 hours a day, six days a week for Terteling Brothers Company, Inc., at the Vogue Coal Company strip mine near Madisonville, Kentucky.

The shovel, powered with a Model LI-600 Cummins Diesel and equipped with a six-yard bucket, digs unblasted coal out of a thick seam and loads up to 575 tons per hour into a fleet of seven Cummins-Powered Euclid Coal Haulers. These hauling units carry up to 45-ton loads, and in one typical eight-hour shift, working on a three-mile round trip, moved a total of 4,300 tons.

*Can you afford  
any other power?*

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA



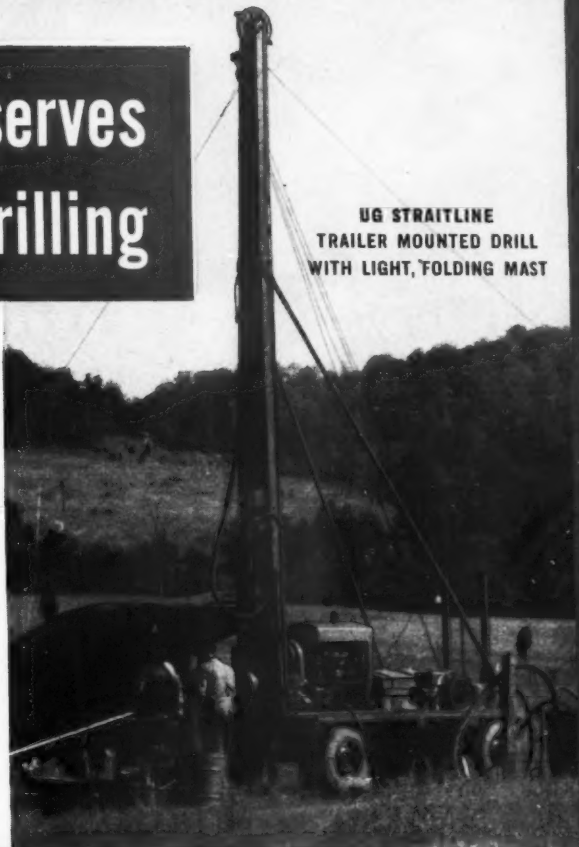
# Increase Mineral Reserves By Diamond Core Drilling

● Rich orebodies become worked out. Even reserves, once adequate, are dangerously low in many cases, yet the long term demand for minerals increases.

How is this challenge to be met? First of all, new deposits must and can be found by systematic exploratory search. Second, every effort should be made to expand present reserves.

The **LONGYEAR** organization will help you to accomplish the above objectives. It will supply you with drills suited to your job, or it will do your drilling under contract, if you prefer.

UG STRAITLINE  
TRAILER MOUNTED DRILL  
WITH LIGHT, FOLDING MAST



**CORE DRILLING ON CONTRACT.** In contracting your drilling to **LONGYEAR**, you gain the following advantages:

**WITHOUT INVESTMENT** on your part, modern **LONGYEAR** core drills and equipment are available for your drilling projects.

**EXPERIENCED CREWS**, using the latest drilling techniques, carry out your exploratory program in accord with your wishes.

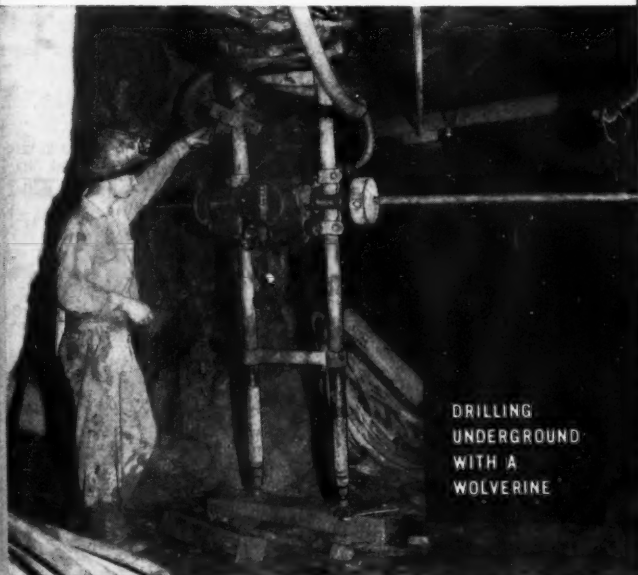
**YOU ARE PROVIDED** with accurate samples, most essential factors in your mineral search.

**DIAMOND CORE DRILLS.** **LONGYEAR** manufactures a complete line of diamond core drills and equipment.

**LIGHTWEIGHT**, easily set up machines are built for underground use.

**STURDY**, mobile equipment is available for rapid surface exploration.

**POWERFUL DRILLS** are made to meet the requirements of deep hole drilling.



DRILLING  
UNDERGROUND  
WITH A  
WOLVERINE

● CONSULT US ON THE PROBLEM OF INCREASING YOUR MINERAL RESERVES

## E. J. LONGYEAR COMPANY

CANADIAN LONGYEAR, LIMITED, NORTH BAY, ONTARIO, CANADA

DIAMOND CORE DRILLS • CONTRACT CORE DRILLING  
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS

REPRESENTATIVES IN PRINCIPAL MINING CENTERS IN THE UNITED STATES AND OTHER COUNTRIES



You Hear It  
At The Face  
And In The  
Front Office



**"ROCKMASTER "16" is the greatest improvement in blasting methods since ATLAS introduced milli-second blasting!"**

IN UNDERGROUND WORKINGS, pits, quarries, and construction jobs you hear a lot of enthusiastic talk from men and management about the advantages of the ROCKMASTER "16" Blasting System.

For example, blasting men at the face talk about better breakage, savings in dynamite, better control of throw, quicker return to the face. And mining men talk about a safer roof—the result of the lack of vibration typical of ROCKMASTER "16" shooting. When this talk finds its way to the front office, it is quickly translated into greater safety for workers, less expensive handling and milling of rock, less degradation of coal, better rock-production at less cost.

Blasters everywhere—underground and on the surface—find that ROCKMASTER "16" helps them produce more material per pound of explosive. *Sixteen* periods—a wide choice of short or long milli-second delays—add up to better control over throw, back-break, and material size. And underground, *sixteen* delay periods firing in 550 milli-seconds mean less dust and a quicker return to the face... less strain on timbers and roof.

Ask your Atlas representative for the new ROCKMASTER booklet explaining how ROCKMASTER "16" fits into your operations.

ROCKMASTER: Reg. U. S. Pat. Off.

**ATLAS** EXPLOSIVES  
"Everything for Blasting"

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco



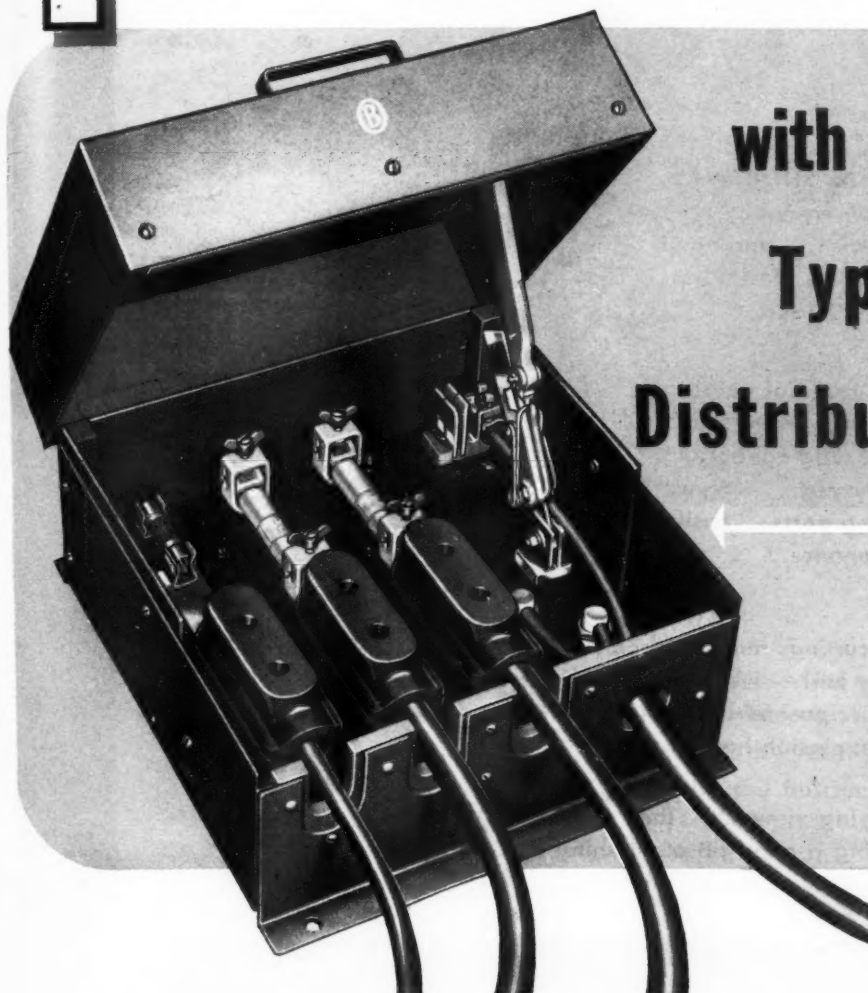
**ROCKMASTER "16"  
TIMINGS**

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero) . . . . .	0 (inst.)
1 . . . . .	8
2 . . . . .	25
3 . . . . .	50
4 . . . . .	75
5 . . . . .	100
6 . . . . .	125
7 . . . . .	150
8 . . . . .	175
9 . . . . .	200
10 . . . . .	250
11 . . . . .	300
12 . . . . .	350
13 . . . . .	400
14 . . . . .	450
15 . . . . .	500
16 . . . . .	550



# 1 Cable does the work of 3

## with O-B's Type-M Distribution Box



O-B's Type-M Distribution Box—for use in good air.

You can operate as many as three machines from one trailing cable with O-B's Type-M Distribution Box. Connected to the power source by a single cable, the O-B Type-M Distribution Box gives you a portable switch panel with three outlets right at your machines.

In addition to being a convenient switch panel for making easy, plug-in machine cable connections, the Type-M Distribution Box protects your power flow. Each branch circuit is individually fused, providing back-up protection for machine cables and controllers.

An interlocked disconnect switch cuts the power off when the box is opened.

This safety feature prevents branch circuits from being connected or fuses renewed with a closed circuit.

You'll get full efficiency from your face machinery—and with complete protection when you handle power through O-B Type-M Distribution Boxes. Write for booklet K-388 for a complete description of the Type M.



3017-M

# Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

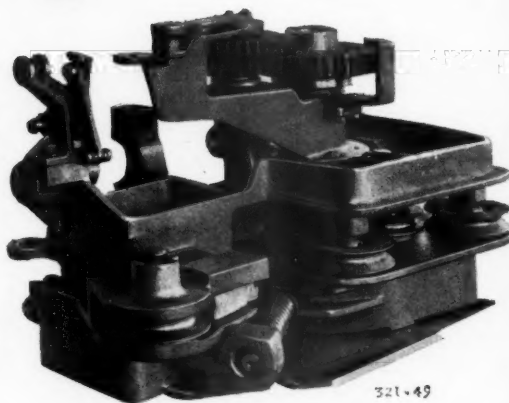
# SLACK HANDLING D E V I C E . . .

Jeffrey 35-B or 35-BB SHORTWALL Machines can now be equipped with a Slack Handling Device, a packaged unit (right) which can be readily applied to machines in the field.

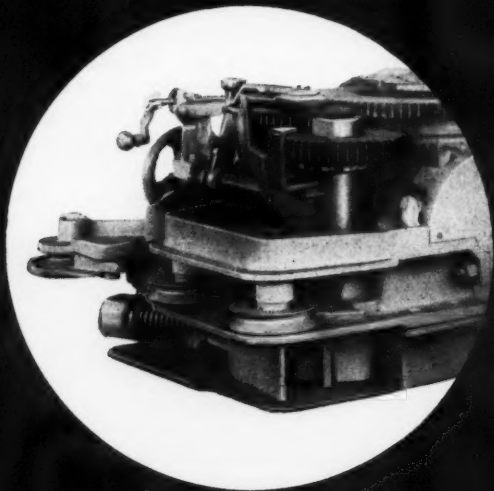
Simple to apply . . . original gearing is utilized . . . no changes necessary to top plate and rollers. Original bottom pan extension is removed . . . device bolted on. Few moving parts . . . easily accessible for maintenance.

70% to 85% of the cuttings removed from kerf . . . no cleaning necessary before firing shots. Cleaner kerf—less powder—better sized coal. Shoveling slack eliminated . . . slack is pushed under slack pile—not thrown. Coal dust reduced to minimum—as is explosion hazard.

Study the accompanying views . . . they show the Device as a unit, as part of the machine and doing a neat job of cleaning kerf in a mine. The drawing on next page illustrates flow of slack.



Here you see the Slack Handling Device all wrapped up in a neat package and ready to go to work for you.





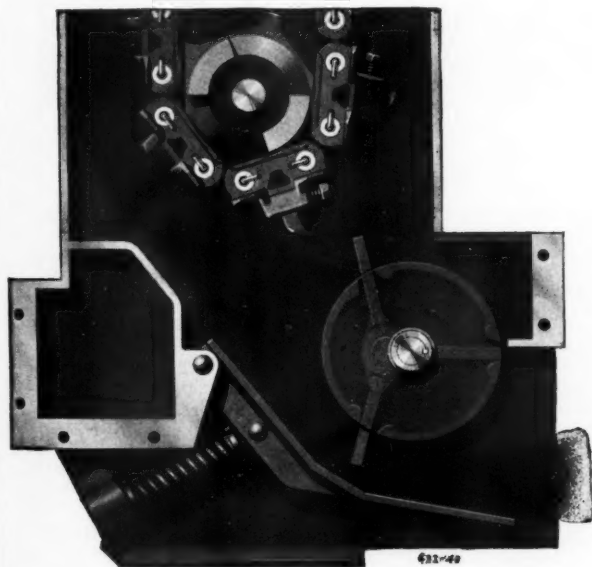
# IT

Discharges slack along side of cutter away from kerf, assuring a better fall of coal.

Eliminates cleaning kerf by manual labor



Drawing below shows the principle of this New Slack Handling Device. Manganese steel paddles move the cuttings from the cutter chain to rear of machine. Paddles have an eccentric movement and are driven by the paddle drum.



**T**HE Device can be added easily to your present Jeffrey 35-B and BB SHORTWALL Machines by removing the old bed frame extension and bolting to machine. As simple as that.

A control lever is provided to disengage the drive mechanism when machine is not cutting, or is being positioned for cutting or moving. Gearing protected by shear pin. We will be glad to go into more detail . . . let us hear from you.

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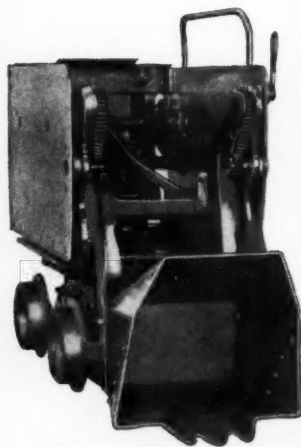
Gardner-Denver "Big Bite" GD14 Mine Car Loader

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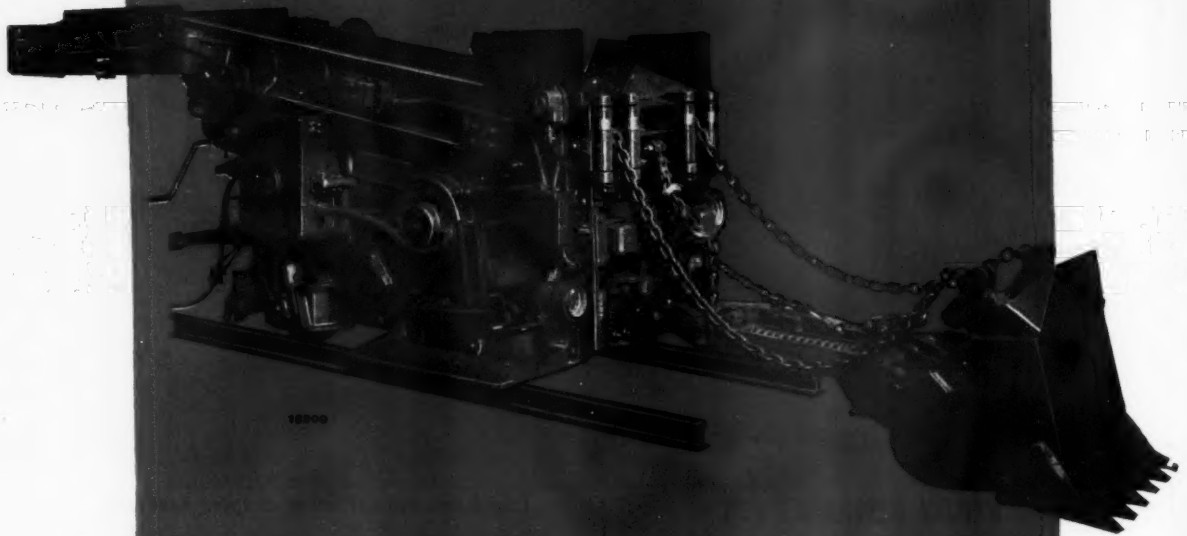
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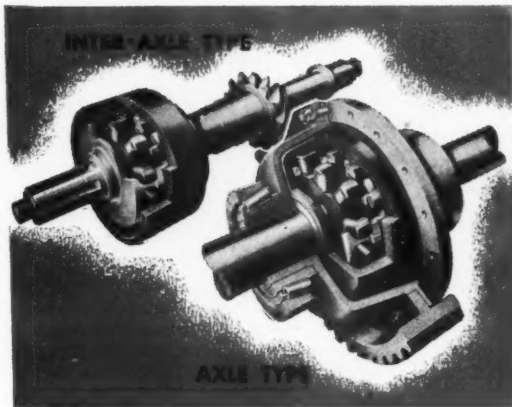
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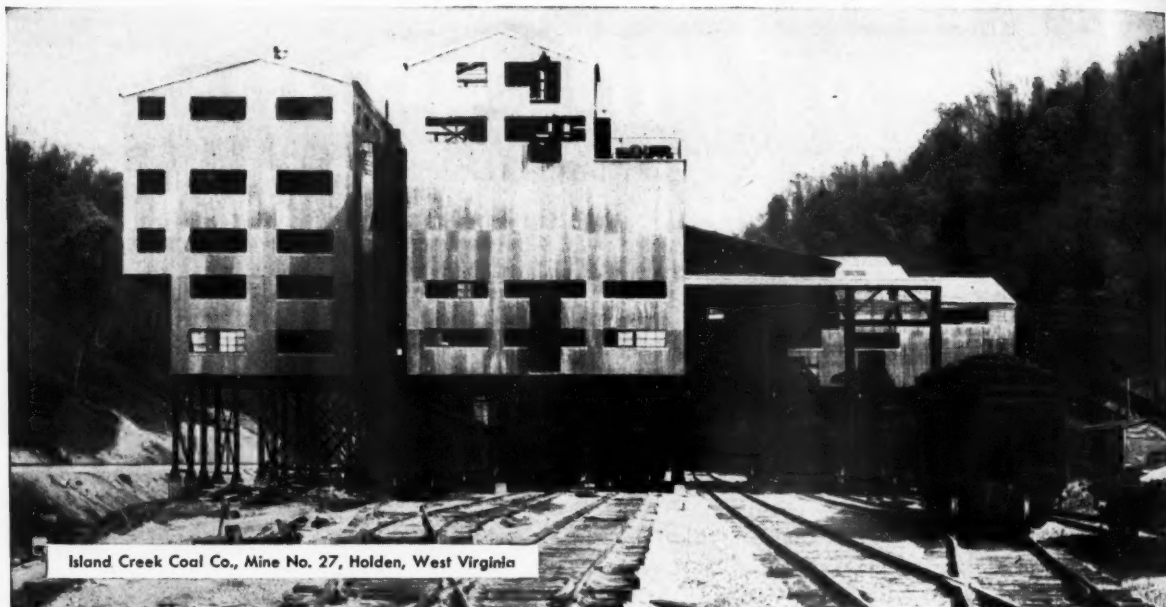


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# Mining

CONGRESS JOURNAL

**Published for the Entire Mining Industry**

**by the AMERICAN MINING CONGRESS**

**SHELDON P. WIMPFEN, Editor**

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## America At the Crossroads

RECENTLY, in describing the struggle for power between the leaders of major unions, Enders M. Voorhees, chairman of the U. S. Steel Corporation's finance committee, stated that the success of the militant leader of the United Mine Workers of America was but a symbol of what is happening in other industries. Wooed by the Government, labor unions have been given, in many respects, far greater powers than management in the basically important industries they dominate.

Now, the CIO United Steel Workers is following the trail blazed by the UMWA and bids to go further. Unprecedented measures are being taken to emulate and surpass the gains won by the UMWA, regardless of the burden imposed on society.

Establishment of the President's three-man fact-finding board to investigate the steel industry is an alarming step to those who dread further travel down the road to statism. This board was set up despite the existence of provisions in the Taft-Hartley Act expressly designed to cope with such situations. True the threatened steel strike was averted, or at least delayed, but it is highly questionable whether the means were justifiable.

Clarence B. Randall, president, Inland Steel Co., has clearly stated to the board what the result may be. He termed the announcement of the board's formation an industrial revolution and a declaration of favor towards a new social order under which wages shall be fixed by the Government. This step, he stated "is always the first one taken by those who set out to establish a socialistic or corporative State. The fixing of profits comes next, and then when incentive is killed and production falls, the final step of nationalization follows."

Resort to the use of the board, Mr. Randall charged, has destroyed collective bargaining. Steel producers are forced to plead their case before strangers unfamiliar with steel production and with no knowledge of the employees, except that formulated by power-acquisitive union leaders.

"It is a different America," Mr. Randall asserted, "if three men are permitted to substitute their judgment for that of hundreds and thousands of managers of businesses all over the country. President Truman recently criticized the bigness of business.

But the bigness which he has here created is a bigness so incalculable that it can destroy America. It is a bigness that no three men, gifted though you may be, ought to be asked to assume. It is a bigness that denies every American tradition, and that must be resisted if America is to remain free. . . . This is labor monopoly given its blessing by Government and by the same Government that cries monopoly at management."

These ringing words foretell what can happen if unions, aided and abetted by Government, are allowed to continue to swing their weight to weaken the free enterprise system. The profligate use of the union's power to destroy is paving the coal industry's road to ruin. Following this lead, the steel union is driving to force industry to meet equally ruinous terms.

The executive and legislative branches of our Government should act now in the interests of the majority of Americans to curb the destructive power of labor leaders before this growing threat wrecks our economic system.

## Annual Clinic

ONE of the most important aspects of the American Mining Congress' annual metal mining conventions is the examination and interpretation of changes in the industry stemming from economic law and governmental edict. Although some confusion may be created by the action of economic law, ill-conceived legislation can readily result in chaos. Both natural and man-made rules must be better understood and constructive action taken to promote the industry's welfare.

The problem is complex. In addition to economic and legal obstacles, mining faces growing technical difficulties. Rising metal consumption must be met from ores of continually declining grade. In 1948 the average yield of copper per ton of ore was 0.92, less than a third of what it was 50 years ago, and a similar change has taken place in lead, zinc, and many other metals. The iron ore industry faces a new era as it plans to process taconite ores.

Present-day conditions more than ever dictate that we share and employ our knowledge. Annual conventions achieve this objective by bringing forth the best thought of industry in meeting general, legislative and technical problems.

Experts in the various fields of mineral production have devoted many years to serious study of mining problems. In a whole-hearted cooperative spirit, they bring to these conventions the essence of their work. There the carefully considered opinions of these leaders become the knowledge of all.

But no man knows the entire story. Your own experience can help others solve their particular problem. You too can help by participating with your observations. Thus these annual conventions can contribute still further to the year's progress as we attempt to clear the path and proceed with the mission of supplying the nation with metals and mineral products.





Huge fine grinding plant at Morenci requires careful synchronization and control

# Principles of Milling Control

## Process Instrumentation Provides Tools for Better Measurement

By R. E. BYLER  
Vice-President  
The Merrill Company

IN the chemical and petroleum processing industries, the extensive use of automatic control and instrumentation is responsible to a large degree for the economic success of many modern processes. In fact some of these successful continuous processes could not be operated without modern instrumentation and automatic control.

In the processing of minerals, the use of process control instrumentation in the past could not be considered extensive. But the picture is changing and in recent years considerable know-how has been accumulating on the application of modern control devices to mineral processing operations.

Alert mine managers and progressive mill superintendents and operators are aware of this trend and are interested in finding out what these tools might do for them and how much instrumentation is justified in specific operations, as measured by an increase in net earnings.

No weighty problem is involved in reaching a decision as to whether a gadget here, or an indicator there, may be economically justified. It usually takes only one good spill of a tailings-pump sump to convince the

superintendent that some kind of an automatic preventive must be installed. But, if that control should be put in, how about a continuous indicator for pulp density on the classifier overflow, and is a recording pH

Automatic controls usually have as their objective the balancing of unstable conditions within such limits that the process proceeds at maximum

**Economic advantages that might be gained by the installation of automatic controls are the final criteria justifying their adoption. This discussion presents the factors that should be considered when contemplating the application of instrument controls to milling operations.**

indicator or full automatic control justified to help keep the alkalinity at the correct level. The question is "How much automatic control and instrumentation can I profitably use in my plant?"

Several factors must be evaluated in order to find the answer to this question. One must determine not only what should be controlled, but how it can be controlled, and why the control would be profitable.

efficiency. It may be assumed that we know the optimum conditions, or those under which the process produces the desired end results. To maintain this desired condition we must have a clear picture of what the independent and dependent variables are, and their influence on the "balance" of the condition we want to maintain.

This may not be particularly difficult to work out for some unit opera-



tions, but it can become a formidable task when the process is complex, or when the fundamental interrelations between several variables and their over-all effect on the process is not clear. To apply automatic control we may measure the change in one variable but actually exert control, or balance, on the operation by adjusting another variable.

For example, in a process for converting sphalerite to zinc sulphate by roasting, the measurement of temperature variations over the hearth may be used to indicate the quality of the process. On the basis of this measurement, the actual outcome of the process may be automatically controlled by a suitable response which varies the supply of air or oxygen to the process, through means of a motorized draft gate.

At the Tennessee Copper Co. considerable study preceded the conclusion that the addition of Xanthate could be automatically regulated by measuring an entirely different variable—the conductivity of the pulp. Hence, it is obvious that the measured variable must be selected with great care. It cannot be emphasized too strongly that automatic controls and regulating systems must be "tailor-made" if a high quality of control is to be obtained. Process control methods used in one mineral processing plant cannot usually be lifted bodily and installed with equally successful results in some other similar plant. However, the experiences of others can be applied to augment a thorough study of one's own conditions.

In surveying a plant and process to determine the "what and how" of



Small mills, such as that of Knob Hill Mines, Inc., can effectively use automatic controls

automatic controls cooperative effort between mill operators, metallurgists, and mechanics is essential. The collaboration of an instrument engineer, or the representative of an instrument manufacturer, is most desirable, if not essential.

### Is Control Justified?

Excluding devices that protect the health, or insure safety, the installation of an automatic control device or system is not justified unless it directly or indirectly results in a tangible economic benefit. These economic benefits may derive from one or more several factors:

(1) An improvement in metallurgical recoveries or products may be obtained. The process is held in much closer adjustment by automatic control than is possible with manual operation. Indicating in-

strumentation provides continuous intelligence as to the trend of the measured variable, thus enabling operators to make necessary corrections before an adverse trend or its effect might otherwise be discerned. The more rapidly a knowledge of process performance is obtained the sooner any required adjustments may be made.

(2) Saving in power or supplies may result. By holding the ball mill operation at the optimum point, for example, considerable electrical power may be saved.

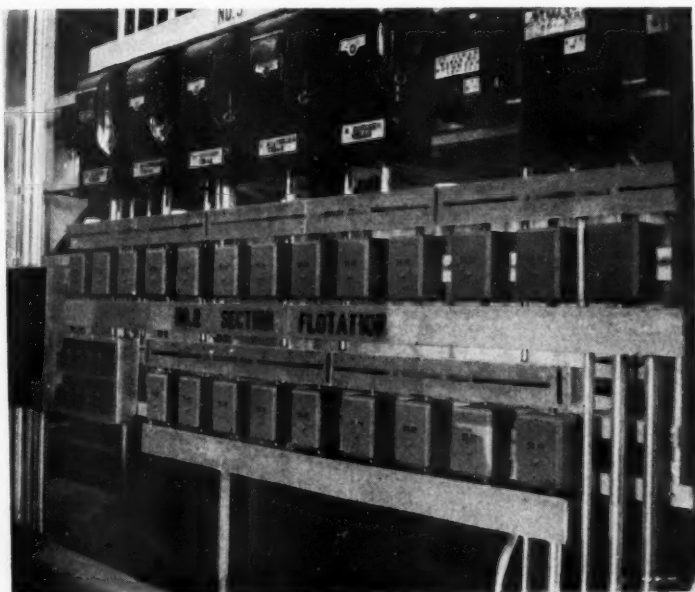
(3) Increases in output capacities of plant equipment is made possible by some type of control. Certain controls assure constant full loading of crushing and grinding equipment.

(4) A reduction in the cost of attendance or supervision is often an important contribution of automatic control and instrumentation. Man-hours may be liberated for utilization in other more profitable work. In some cases an actual decrease in the number of crew men required may be realized.

(5) The elimination of human error by the application of automatic controls may be highly important to improve results.

Some of these benefits may not be easy to estimate, but a careful study usually enables one to arrive at a fair approximation of the benefits to be derived. Potential metallurgical savings may be determined by metallurgical testing, or anticipated by a correlation of mill records and results under various conditions. Laboratory testing frequently brings to light an optimum set of conditions for desired grade or recovery, or it may point up the deleterious effect of small fluctuations in some variable.

To arrive at an over-all complete picture of potential benefits, all proposed controls and instrumentation for a plant must be evaluated collec-



New Magma mill is designed for central control

tively as well as individually. Some controls, considered alone, may not be justified economically, whereas, when grouped with several others, they become well worthwhile. For example, a single automatic control in one step of a process is not likely to make possible a reduction in size of the plant crew, but the use of this control in conjunction with several others throughout the plant may reduce the required attendance to the point where a smaller crew is adequate. It is almost axiomatic, from the labor saving standpoint, that the closer the approach to full automatic control the lower the labor cost will be.

inary study and investigation may cost considerably more than the actual instrumentation and control system itself. One progressive mining company reports the cost of development work done in designing an automatic control system amounted to approximately \$10,000, whereas the installed cost of the controls did not run over \$5,000. Although this is not a particularly large operation, it is presently spending one cent per ton of ore on research work directly concerned with devising further instrumentation and controls for their operation. The installed cost of process instrumentation and automatic controls in some chemical and petroleum

## Maintenance of Control

If not properly conceived or maintained, automatic controls can make errors or operate defectively. Sometimes the control can get out of synchronism or fail to operate even when everything seems in perfect condition. Therefore, this special equipment must be properly serviced and maintained. If plant personnel does not include talent with the necessary command of instrument maintenance, electronic devices, servomechanisms, etc., the addition of an instrument-man to the payroll is certainly indicated.

A carefully scheduled maintenance program will minimize instrument and control system troubles. In the average mineral processing plant such maintenance cost should not exceed one-half cent per ton ore milled. Some chemical and petroleum process plants having extensive instrumentation, however, require separate instrument maintenance departments under the supervision of qualified instrument engineers. The personnel of such a department may run from one man to four or more men, corresponding roughly to installations of automatic control equipment ranging from \$10,000 to \$100,000 or more.

Consistent growth of the rate of adoption of process instrumentation and automatic controls indicates that their economic worth justifies wider use. Although the fully automatic mill may not be just around the corner, every operator would be well advised to study his own plant to determine where instrumentation and controls can improve his processes and at the same time provide an economic benefit.



Nonmetallic milling plants, such as Northwest Magnesite Co., improve efficiency with extensive instrumentation and control

At one flotation plant, effective control measures and instrumentation contributed largely to reducing the operating crew. The labor formerly required in the mill was one man-day per 33 tons of ore milled. Since the installation of controls, 230 tons are milled per man-day of attendance.

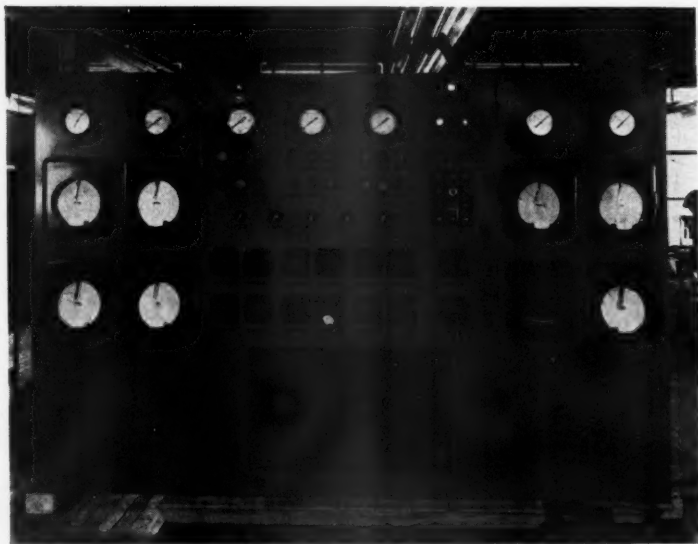
There is usually, of course, an irreducible minimum of manpower, owing to safety, fire, and other considerations. However, during the war, a plant was built where the consideration of safety to personnel dictated that nobody be allowed in the building while the plant was operating. All equipment was automatically controlled with the indicating and control instrument panel located at a safe distance in another building.

## Consider Installed Cost

Charges for amortization of the installed cost of the proposed instrumentation and control system, maintenance charges, including servicing, supplies, and repairs must be considered to complete the picture. These costs cannot be estimated with acceptable accuracy until the system has been laid out and equipment specified. The total installed cost must also include the cost of development work and of the sometimes complex studies required to determine the "what and how" of the control.

More often than not the prelim-

plants may run from two to five percent of the total cost of equipment. In special cases it may run as high as 8-12 percent, or more. Mineral processing plants, however, do not have, and are not likely to require, such extensive investment because the nature of the unit operations involved is less complex.



Recording, indicating and automatic control instrument. Transfer switches in center permit manual control

WESTERN DIVISION  
AMERICAN MINING CONGRESS  
1949

METAL MINING  
CONVENTION







**M**INING industry representatives from every mineral producing region of the United States and from Western Canada will meet in the key city of the Northwest's Inland Empire, September 26-28. In an open forum on industry problems, the entire scope of the mining industry, from "putting rock in the box" on up through economic and legislative questions will come in for critical analysis and discussion.

Nine sessions treating with all phases of the mining field and associated questions have been arranged. A hardworking nation-wide Program Committee, headed by William J. Coulter, has composed a convention program designed to bring forth the best thought of mining leaders on topics considered to be of the greatest significance to this progressive industry.

Related subjects have been grouped together in five general sessions covering the over-all business outlook; prospects for metals and nonmetallics; labor-management questions; the Communist threat in labor unions; taxes, exploration and production incentives, stockpiling and tariffs; problems of the small mine operators; public land policies and finding mines of the future.

Mine and mill operating problems will be given thorough treatment in four sessions set up to highlight the phases of ore production

## Mining Men to Exchange View Problems and

and beneficiation of current importance. Among the subjects to be presented by mining men of extensive experience are: new developments in milling practice; Diesel power underground; conveyor belt transportation; large diameter churn drill blast holes; sinking an inclined shaft; results obtained with various types of insert and single-use rock drill bits; nonmetallic mining; dust control; roof bolting; and mine safety.

Many of the subjects will be supplemented by further remarks from men experienced with the problems under consideration. Questions and discussion from the floor are welcomed and sought after in order to derive the greatest wealth of information from this annual open forum on the manifold aspects of the mining field.

### Key Men Offer Considered Thought

Many widely known men are contributing to this important meeting the benefit of their long experience and intimate knowledge of special and general mining subjects. Repre-



STANLEY A. EASTON  
President, Bunker Hill & Sullivan  
Mining & Concentrating Co.  
Chairman, Western Division

# with SPOKANE as Host



WILLIAM J. COULTER  
General Manager  
Climax Molybdenum Co.  
National Chairman



HOWARD L. YOUNG  
President, American Zinc, Lead &  
Smelting Co.  
President, American Mining Congress

## Views on Industry lay Plans for the Future

senting the Federal Government will be Pat McCarran, U. S. Senator from Nevada; Marion Clawson, director, Bureau of Land Management; Dr. James Boyd, director, U. S. Bureau of Mines; William E. Wrather, director, U. S. Geological Survey; and Ward M. Canaday, consultant, National Munitions Board.

Outstanding industry officials, experts in their respective field, are taking an active part in the Convention. Their views on problems with which they are especially familiar, will be significant in clarifying the present status of the mining industry and in serving as a foundation for building the future. The thanks of the entire mining industry goes to this large group for their wholehearted cooperation in making the benefits of their experience available to all.

A detailed study of the program shows that the Western Division of the American Mining Congress, under the able leadership of Chairman Stanley A. Easton, deserves high praise for staging a comprehensive meeting of value



**JULIAN D. CONOVER**  
Secretary  
American Mining Congress

and interest to all those associated with mining.

General arrangements for this first meeting in the Northwest since 1929 have been molded by active committees working under Chairman R. M. Hardy, president, Sunshine Mining Co., together with Vice-Chairman Roger O. Oscarson, secretary, North-

west Mining Association. Wide publicity has been given this eventful Convention by James

A. Ford, managing secretary, Spokane Chamber of Commerce. The Housing Committee, working together with Chairman J. A. McCluskey, has been tackling the task of providing facilities for the large expected attendance.

Wray D. Farmin, as Chairman of the Trips Committee, has received the utmost in co-operation from the mining companies and other organizations, in arranging "post-Convention" trips designed for seeing the many significant features of the Inland Empire.

### Entertainment

Cooperating committees have designed a series of fine events to provide relaxation and entertainment. These well-planned occasions will be enjoyed by miners and their ladies as they offer an excellent opportunity to meet with old and to make new friends.

## WESTERN DIVISION

### THE AMERICAN MINING CONGRESS

STANLEY A. EASTON, Chairman

Pres., Bunker Hill & Sullivan Mining & Concentrating Co.

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C. J. ABRAMS, Gen. Supt., Climax Molybdenum Co.

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WILLIAM H. GOODRICH, Gen. Mgr., Chino Mines Div., Kennecott Copper Corp.

ROY A. HARDY, Cons. Engr. in Charge, Getchell Mine, Inc.

GEORGE T. HARLEY, Mgr., Potash Operations, International Minerals & Chemical Corp.

D. I. HAYES, Western Mgr., American Zinc, Lead & Smelting Co.

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ELMER ISERN, Pres., Eagle-Picher Mining & Smelting Co.

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E. S. McGLONE, Vice-Pres., Anaconda Copper Mining Co.

ROBERT S. PALMER, Exec. Dir., Colorado Mining Assn.

B. T. POXSON, Chr., Emperius Mining Co.

JAMES K. RICHARDSON, Mgr., Utah Mining Assn.

HENRY M. RIVES, Secy.-Treas., Nevada Mine Operators Assn.

TOM C. RUSSELL, Gen. Supt., Fertilizer Div., Anaconda Copper Mining Co.

S. R. SMITH, Pres., Bonanza Mines, Inc.

FRANCIS A. THOMSON, Pres., Montana School of Mines

E. McL. TITTMANN, Mgr., Southwestern Dept., American Smelting & Refining Co.

CARL J. TRAUERMAN, Secy.-Treas., Mining Assn. of Montana

H. E. TREICHLER, Vice-Pres. & Gen. Mgr., Texas Gulf Sulphur Co.

F. C. VAN DEINSE, Vice-Pres. & Gen. Mgr., Yuba Consolidated Gold Fields

F. A. WARDLAW, Jr., Gen. Mgr., International Smelting & Refining Co.

GEORGE A. WARNER, Gen. Mgr., Zuni Milling Co.

LEWIE WILLIAMS, West Coast Mineral Assn.

CHARLES F. WILLIS, State Secy., Arizona Small Mine Operators Assn.

S. H. WILLISTON, Vice-Pres., Cordero Mining Co.

RICHARD A. YOUNG, Vice-Pres., American Zinc Co. of Illinois



**R. M. HARDY**  
General Chairman

# Arrangements Committee



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Vice-Chairman



**MRS. R. P. PORTER**  
Ladies



**JAMES A. FORD**  
Publicity



**J. A. McCLUSKEY**  
Housing



**WRAY D. FARMIN**  
Trips

At the Welcoming Luncheon on Monday, September 26, in the Spokane National Guard Armory, Stanly A. Easton, Chairman of the Western Division of the American Mining Congress and president, Bunker Hill & Sullivan Mining & Concentrating Co. will preside. The Honorable Arthur B. Langlie, Governor of the State of Washington, will extend the hand of welcome and R. W. Diamond, vice-president and general manager, Consolidated Mining & Smelting Co., Ltd., Trail, B. C., will bring greetings from the Canadian mining fraternity. Brief responses will be made by Howard I. Young, President of the American Mining Congress, and president, American Zinc, Lead and Smelting Co.; William J. Coulter, Chairman of the Convention Program Committee and general manager, Climax Molybdenum Co.; and J. H. Fulford, Chairman of the Manufacturers Division of the American Mining Congress, and vice-presi-

dent, Jeffrey Manufacturing Company.

On this memorable occasion, Herman W. Steinkraus, president of the Chamber of Commerce of the United States and president, Bridgeport Brass Co., will speak on "Labor-Management Relations Today." Mr. Steinkraus is noted for his constructive views on the relations between workmen and management and on sound labor legislation.

Spokane's famous Natatorium Park will be the scene of the Mining Jamboree on Monday evening. Refreshments will be served followed by an appetizing box lunch plus typically western hot food. Special entertainers will put on a skilled performance and several hours of dancing in the Natatorium ballroom will round out a thoroughly enjoyable evening.

In order for Convention visitors to have an opportunity to see the sights in Spokane and meet with friends, Tuesday night has been left open.

# PROGRAM

## ALASKA

AL ANDERSON  
*Alaska Miners Association*

GLENN CARRINGTON  
*Glenn Carrington & Co.*

ROY B. EARLING  
*U. S. Smelting Refining & Mining Co.*

H. L. FAULKNER  
*Faulkner, Banfield & Boochever*

ERNEST N. PATTY  
*Alluvial Golds, Inc.*

J. H. SCOTT  
*J. H. Scott Co.*

## ARIZONA

THOMAS G. CHAPMAN  
*University of Arizona*

ERNEST R. DICKIE  
*Bagdad Copper Corp.*

GROVER J. DUFF  
*Eagle-Picher Mining & Smelting Co.*

CHARLES H. DUNNING  
*Arizona Dept. of Mineral Resources*

WESLEY P. GOSS  
*Magma Copper Co.*

JOSEPH H. HEDGES  
*U. S. Bureau of Mines*

ROBERT W. HUGHES  
*Miami Copper Co.*

CHARLES R. KUZELL  
*Phelps Dodge Corp.*

HAROLD F. MILLS  
*Shattuck-Denn Mining Corp.*

BRENT N. RICKARD  
*American Smelting & Refining Co.*

ROBERT W. THOMAS  
*Kennecott Copper Corp.*

JOSEPH A. WILCOX  
*Shattuck-Denn Mining Corp.*

CHARLES F. WILLIS  
*Arizona Small Mine Operators Assn.*

## CALIFORNIA

H. A. SAWIN  
*Yuba Consolidated Gold Fields*

P. R. BRADLEY, JR.  
*Pacific Mining Co.*

WORTHEN BRADLEY  
*Bradley Mining Co.*

WILLIAM C. BROWNING  
*Golden Queen Mining Co.*

GORDON I. GOULD  
*H. W. Gould & Co.*

CLAUDE G. GRIM  
*Pacific Coast Borax Co.*

VICTOR J. HAYEK  
*Mining Assn. of the Southwest*

IRA B. JORALEMON  
*Cons. Engr.*

L. T. KETT  
*Mountain Copper Co., Ltd.*

ALBERT F. KNORP  
*California Chapter, American Mining Congress*

H. S. LORD  
*Dragline Gold Producers of California*

DONALD H. McLAUGHLIN  
*Homestake Mining Co.*

HENRY T. MUDD  
*Mining Engr.*

HENRY MULRYAN  
*Sierra Talc & Clay Co.*

NEIL O'DONNELL  
*Idaho Maryland Mines Corp.*

ROBERT M. SEARLS  
*Attorney at Law*

EDWARD WISSER  
*Cons. Mining Geol.*

## COLORADO

C. J. ABRAMS  
*Climax Molybdenum Co.*

BLAIR BURWELL  
*Mineral Engineering Co.*

E. D. DICKERMAN  
*Mining Engr.*

C. E. DOBBIN  
*U. S. Geological Survey*

E. D. GARDNER  
*U. S. Bureau of Mines*

J. PAUL HARRISON  
*American Smelting & Refining Co.*

O. H. JOHNSON  
*Idorado Mining Co.*

ROBERT S. PALMER  
*Colorado Mining Assn.*

GEORGE H. RUPP  
*Colorado Fuel & Iron Corp.*

MERRILL E. SHOUP  
*Golden Cycle Corp.*

M. I. SIGNER  
*Colorado School of Mines*

R. H. SUMMER  
*E. I. du Pont de Nemours & Co., Inc.*

HARVEY L. TEDROW  
*El Paso Mines, Inc.*

H. S. WORCESTER  
*Telluride Mines, Inc.*

## IDAHO

HAROLD D. BAILEY  
*Bradley Mining Co.*

J. E. BERG  
*Federal Mining & Smelting Co.*

DONALD A. CALLAHAN  
*Callahan Consolidated Mines, Inc.*

WILLIAM COOMBE  
*Federal Mining & Smelting Co.*

EDWARD B. DOUGLAS  
*Blackbird Div., Calera Mining Co.*

JOHN EDGAR  
*Sunshine Mining Co.*

A. W. FAHRENWALD  
*University of Idaho*

S. K. GARRETT  
*Cons. Engr.*

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W. R. ALLEN  
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*Beaverhead Mining Assn.*

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*American Machine & Metals, Inc.*

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*Madison County Mining Assn.*

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*Anaconda Copper Mining Co.*

W. E. MITCHELL  
*Anaconda Copper Mining Co.*

WALTER H. MYERS  
*U. S. Grant Mining Co.*

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*Porter Bros. Corp.*

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*Montana Phosphate Products Co.*

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*Anaconda Copper Mining Co.*

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*Taylor-Knapp Co.*

FRANCIS A. THOMSON  
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(Continued)



(NEVADA Continued)

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Kennecott Exploration Dept.

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CECIL FITCH  
Chief Consolidated Mining Co.

OSCAR A. GLAESER  
U. S. Smelting Refining & Mining Co.

OTTO HERRES  
Combined Metals Reduction Co.

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Geneva Coal Mines

PAUL H. HUNT  
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GEORGE H. WATERMAN  
Manufacturers Mineral Co.

LEWIE WILLIAMS  
Attorney at Law

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Tri-State Zinc, Inc.

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Bilharz Mining Co.

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Nellie B. Mining Co.

FRED CHILDRESS  
Mahutska Mining Co.

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Missouri Division of Geological Survey & Water Resources

S. S. CLARKE  
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Republic Steel Corp.

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Inland Steel Co.

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Oliver Iron Mining Co.

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Lake Superior Iron Ore Assn.

VERNE D. JOHNSTON  
Oglebay Norton & Co.

GROVER LEVEQUE  
Interstate Iron Co.

ENDICOTT R. LOVELL  
Calumet & Hecla Cons. Copper Co.

RAY D. NOLAN  
Division of Lands & Minerals, Minnesota  
Department of Conservation

J. MURRAY RIDDELL  
Michigan College of Mining & Technology

CHARLES J. STAKEL  
Cleveland-Cliffs Iron Co.

EASTERN

FRANK A. AYER  
Copper Range Co.

FRANCIS CAMERON  
St. Joseph Lead Co.

HARLEY A. COY  
American Zinc Co. of Tenn.

JAMES DOUGLAS  
Phelps Dodge Corp.

ERNEST V. GENT  
American Zinc Institute, Inc.

JOSEPH T. HALL  
Callahan Zinc-Lead Co.

EVAN JUST  
Economic Cooperation Administration

RALPH E. KIRK  
Tenn. Coal, Iron & Railroad Co.

ROBERT J. LINNEY  
Republic Steel Corp.

J. D. MACKENZIE  
American Smelting & Refining Co.

R. L. McCANN  
New Jersey Zinc Co.

H. S. McQUEEN  
Alcoa Mining Co.

R. J. MECHIN  
St. Joseph Lead Co.

FRANK R. MILLIKEN  
National Lead Co.

THOMAS G. MOORE  
American Metal Co., Ltd.

JOHN F. MYERS  
Tennessee Copper Co.

W. E. ROMIG  
Copper Range Co.

F. E. WORMSER  
St. Joseph Lead Co.

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Vulcan Iron Works Co.

WILLIAM E. GOODMAN  
Goodman Manufacturing Co.

R. K. GOTTSALL  
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J. T. RYAN, JR.  
Mine Safety Appliances Co.

V. L. SNOW  
Euclid Road Machinery Co.

WILLIAM M. WALLACE  
Allis-Chalmers Mfg. Co.

W. A. WIRENE  
General Electric Co.

The social event of the mining year, the 1949 Annual Banquet, will be held on Wednesday evening in the Davenport Hotel. Donald A. Callahan, Vice-President of the American Mining Congress and president of Callahan Consolidated Mines, Inc., will be toastmaster. The extensive lobby and the mezzanine will be utilized for this outstanding affair. Unusually skilled Northwestern talent will entertain the banquet-goers and an evening of dancing, both modern and "old-time" will follow.

In addition to the regular Convention functions, to which all ladies are invited to attend, some specially planned entertainment has been arranged by the Ladies' Committee working with the Chairman, Mrs. Robert P. Porter. Monday afternoon the ladies will be guests of Mr. and Mrs. Porter at their lovely Spokane home. Following luncheon on Tuesday at the Early Birds Club in the Davenport Hotel, an exclusive showing of the latest fashions will bring the ladies up to date on wearing apparel.

#### Trips—An Added Feature

Fine trips have been arranged to follow the week's Convention activities. They offer an opportunity to see some of North America's major mining and metallurgical operations and

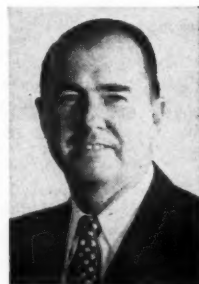
### Manufacturers Division Officers



J. H. FULFORD  
Jeffrey Mfg. Co.  
Chairman



J. I. HUETHER  
General Electric Co.  
Past Chairman



M. L. MCCORMACK  
Ingersoll-Rand Co.  
First Vice-Chairman



JOHN T. RYAN, JR.  
Mine Safety Appliances Co.  
Second Vice-Chairman



C. B. STAINBACK  
Westinghouse Electric Corp.  
Third Vice-Chairman

to enjoy many of the Pacific Northwest's unusually fine scenic attractions.

Trip No. 1 on Thursday, September 29, is through the Coeur d'Alene district and includes the Kellogg, Page, and Pine Creek areas. Those going on this trip may either visit the Bunker Hill mill to see the new sink-float



GOV. ARTHUR B. LANGLIE



HERMAN W. STEINKRAUS



R. W. DIAMOND



J. STAGG LAWRENCE

# ★ ★ PROGRAM ★ ★

## *Sunday, September 25*

9:00 a.m. to 4:00 p.m. **REGISTRATION**, Mezzanine, Davenport Hotel.

## *Monday, September 26*

8:30 a.m. **REGISTRATION**, Mezzanine, Davenport Hotel.

9:30 a.m. **PRE-SESSION MOTION PICTURE**—"Wyoming."

10:00 a.m. **FIRST GENERAL SESSION—THE STATE OF THE INDUSTRY.**

Chairman: HOWARD I. YOUNG, *Pres.*, American Zinc, Lead & Smelting Co.; *Pres.*, American Mining Congress.

Invocation: THE VERY REVEREND FRANCIS E. CORKERY, S.J.; *Pres.*, Gonzaga University.

Welcome to Spokane: HON. ARTHUR MEEHAN, Mayor of Spokane.

Response: ROBERT M. HARDY, *Pres.*, Sunshine Mining Co., *Chr.*, General Arrangements Committee.

Prospects for the Nonferrous Metals.

DR. JOSEPH ZIMMERMAN, *Editor-in-Chief*, Daily Metal Reporter.

Status of the Strategic Metals.

JOHN D. BRADLEY, *Exec. Vice-Pres.*, Bradley Mining Co.

A Free Market for Gold.

JOSEPH STAGG LAWRENCE, *Vice-Pres.*, Empire Trust Co.

The Future of Silver.

ROSS D. LEISK, *Gen. Mgr.*, Sunshine Mining Co.

Report of Resolutions Committee: General Policy—Gold—Monetary Policy.

12:15 p.m. **WELCOMING LUNCHEON**, National Guard Armory.

Presiding: STANLEY A. EASTON, *Pres.*, Bunker Hill & Sullivan Mining & Concentrating Co.; *Chr.*, Western Division, American Mining Congress.

Welcome to Washington.

HON. ARTHUR B. LANGLIE, Governor of the State of Washington.

Greetings from Canada.

R. W. DIAMOND, *Vice-Pres. & Gen. Mgr.*, Consolidated Mining & Smelting Co. of Canada, Ltd.

Responses: HOWARD I. YOUNG, *Pres.*, American Zinc, Lead & Smelting Co.; *Pres.*, American Mining Congress.

WILLIAM J. COULTER, *Gen. Mgr.*, Climax Molybdenum Co.; *Chr.*, Program Committee.

J. H. FULFORD, *Vice-Pres.*, Jeffrey Manufacturing Co.; *Chr.*, Manufacturers Division, A.M.C.

Address: Labor-Management Relations Today.

HERMAN W. STEINKRAUS, *Pres.*, Bridgeport Brass Co.; *Pres.*, Chamber of Commerce of the United States.

2:00 p.m. **PRE-SESSION MOTION PICTURE**—"Coal Country."

2:30 p.m. **SECOND GENERAL SESSION—LABOR RELATIONS—MINING LEGISLATION.**

Chairman: LOUIS BUCHMAN, *Gen. Mgr.*, Utah Copper Div., Kennecott Copper Corp.

Organization and Work of the Conference of Western Senators.

HON. PAT MCCARRAN, *U. S. Senator from Nevada*; *Chr.*, Conference of Western Senators.

Significant Developments in Mining's 1949 Wage Negotiations.

JAMES K. RICHARDSON, *Mgr.*, Utah Mining Assn.

The Communist Menace in Labor Unions.

ROBERT E. VIVIAN, *Editorial Dept.*, American Metal Market.

Report of Resolutions Committee: Labor Relations.

2:00 p.m. **PRE-SESSION MOTION PICTURE**—"The Story of Lubricating Oils."

2:30 p.m. **FIRST OPERATING SESSION—MILLING PROGRESS.**

Chairman: ROY A. HARDY, *Cons. Engr. in Charge*, Getchell Mine, Inc.

A Perspective of Milling Operations.

NATHANIEL HERZ, *Chief Metallurgist*, Homestake Mining Co.

Improved Flotation from Crushing Plant Change.

JAY J. BURNS, *Mill Supt.*, Edwards Div., St. Joseph Lead Co.

Discussion: E. B. JENNINGS, *Gen. Supt.*, Universal Exploration Co.

New Sink-Float Plant at Sullivan Concentrator.

H. R. BANKS, *Mill Supt.*, Consolidated Mining and Smelting Co. of Canada, Ltd.

Discussion: C. Y. GARBER, *Mill Supt.*, Bunker Hill & Sullivan Mining & Concentrating Co.

6:00 p.m. **MINING JAMBOREE**, Natatorium Park.





SEN. PAT McCARRAN



MARION CLAWSON



WILLIAM E. WRATHER



JAMES BOYD

## Tuesday, September 27

9:00 a.m. PRE-SESSION MOTION PICTURE—"Arizona."

9:30 a.m. THIRD GENERAL SESSION—TAXATION—INCENTIVES—STOCKPILING.

Co-Chairmen: HENRY B. FERNALD, Loomis, Suffern & Fernald; *Chr.*, American Mining Congress Tax Committee.

E. H. SNYDER, *Pres.*, Combined Metals Reduction Co.

Tax Treatment of New Mining Ventures and Producing Mines.

V. C. WANSBROUGH, *Exec. Dir.*, Canadian Metal Mining Assn., and ERNEST N. PATTY, *Pres.* & *Gen. Mgr.*, Alluvial Golds, Inc., and Yukon Gold Placers, Ltd.

S. H. WILLISTON, *Vice-Pres.*, Cordero Mining Co.

Discussion: PAUL B. JESSUP, *Vice-Pres.*, Day Mines, Inc.

MORD LEWIS, Anaconda Copper Mining Co.

DONALD H. McLAUGHLIN, *Pres.*, Homestake Mining Co.

Report of Resolutions Committee: Taxation—Social Security—Governmental Expenditures.

Exploration and Production Incentives.

A. E. PETERMANN, *Gen. Counsel*, Calumet & Hecla Consolidated Copper Co.

W. C. PAGE, *Asst. Gen. Mgr. of Western Operations*, U. S. Smelting Refining & Mining Co.

HENRY L. DAY, *Pres.*, Day Mines, Inc.

JAMES BOYD, *Dir.*, U. S. Bureau of Mines.

Stockpiling.

WARD M. CANADAY, Consultant, National Munitions Board.

Report of Resolutions Committee: Tariffs—Stockpiles—Incentives.

9:00 a.m. PRE-SESSION MOTION PICTURE—"Man-Made Canyon."

9:30 a.m. SECOND OPERATING SESSION—OPEN PIT AND CONVEYOR MINING.

Chairman: PERRY G. HARRISON, *Vice-Pres.*, Hanna Iron Ore Co.

Diesel Engines for Auxiliary Power on Electric Locomotive at Ajo.

ALFRED T. BARR, *Mine Supt.*, New Cornelia Branch, Phelps Dodge Corp.

Discussion: H. L. GARRITY, *Supt. of Mines*, Utah Copper Div., Kennecott Copper Corp.

Conveyor Belt Transportation.

RUSSELL G. HAWORTH, *Asst. Gen. Mgr.*; R. R. KNILL, *Mine Supt.*, and JAMES EDMUNDS, *Mine Development Engr.*, Potash Co. of America.

Discussion: C. A. R. LAMBLY, *Gen. Supt.*, Pend Oreille Mines & Metals Co.

Drilling and Blasting Twelve-Inch Holes.

G. J. BALLMER, *Supt. of Mines*, Chino Mines Div., Kennecott Copper Corp.

Discussion: WARREN E. FENZI, *Gen. Supt.*, Morenci Branch, Phelps Dodge Corp.

1:30 p.m. PRE-SESSION MOTION PICTURE—"Nevada."

2:00 p.m. FOURTH GENERAL SESSION—PROBLEMS OF THE SMALL MINE OPERATORS.

Chairman: A. V. TAYLOR, JR., *Pres.*, Taylor-Knapp Co.

Panel discussion dealing with the problems of the smaller mines—which are so important to all those concerned with the future development and welfare of the mining industry.

Mechanization.

ROGER V. PIERCE, *Cons. Mining Engr.*, Salt Lake City.

Labor Relations.

J. C. KIEFFER, *Mgr.*, Spokane-Idaho Mining Co.

Accounting.

JAMES E. HOGLE, *Asst. Gen. Mgr.*, Rico Argentine Mining Co.

Functions of the Mining Engineer.

FRANCIS A. THOMSON, *Pres.*, Montana School of Mines.

Financing.

CARL J. TRAUERMAN, *Secy.-Treas.*, Mining Assn. of Montana.

JAMES E. NEWTON, *Regional Administrator*, and ELLSWORTH Y. DOUGHERTY, *Mining Engr.*, Securities & Exchange Commission, Regional Office, Seattle.

1:30 p.m. PRE-SESSION MOTION PICTURE—"Underground"—showing mechanization in the Tri-State District.

2:00 p.m. THIRD OPERATING SESSION—MECHANIZATION—IMPROVEMENTS IN MINING PRACTICE.

Chairman: H. F. MILLS, *Mgr.*, Iron King Branch, Shattuck-Denn Mining Corp.

Diesel Power Underground.

S. S. CLARKE, *Gen. Supt.*, Tri-State Mines Div., Eagle-Picher Mining & Smelting Co.

Discussion: J. H. EAST, JR., *Engr. in Charge*, U. S. Bureau of Mines, Denver.

Sinking Bunker Hill's Auxiliary Inclined Shaft.

STANLEY W. McDOUGALL, *Mine Supt.*, and JOSEPH E. GORDON, *Asst. Mine Foreman*, Bunker Hill & Sullivan Mining and Concentrating Co.

Symposium on Insert Bits—

Rock Drilling Progress at the Holden Mine.

J. J. CURZON, *Mgr.*, Chelan Div., Howe Sound Co.

(Continued on page 37)



A. E. BENDELARI



WORTHEN BRADLEY



D. A. CALLAHAN



LOUIS S. CATES



ANDREW FLETCHER



V. P. GEFFINE



JAMES R. HOBBS



H. C. JACKSON



J. C. KINNEAR



MERRILL E. SHOUP

plant or go underground on a tour of the new hoist installations. Following lunch, the Bunker Hill smelter and the Sullivan electrolytic zinc plant will be visited. Transportation and guides will be provided for those who wish to visit the surface plant and mills of the Federal Mining and Smelting Co. or the Sidney, Highland Surprise, Spokane-Idaho, Nabob, and other properties on Pine Creek.

Another trip to the Coeur d'Alene district will be held on Friday, September 30. A visit will be made to the Hecla-Star mill and surface plant at Burke and in the afternoon either the Morning or Dayrock mill will be seen and the surface plant of the Sunshine Mining Co.

Grand Coulee Dam and the ancient waterfalls of the old Columbia river will be seen by trippers who take Trip No. 3 on Thursday, September 29.

Trip No. 4 on Friday, September 30, will

take the travelers to see the Reeves MacDonald mill in British Columbia, the "newest and most modern mill in North America." Returning to the United States in the afternoon an inspection will be made of the mill and surface plant of the Pend Oreille Mines and Metals Co. Digging clothes will be required by those who wish to visit the new inclined shaft.

Industrial plants in the Spokane area will be visited on Trip No. 5, Wednesday, September 28. This is an afternoon trip which offers an opportunity to inspect the Trentwood Rolling mill of the Permanente Metals Corp. and the ferrochrome plant of the Pacific Northwest Alloys, and Permanente's aluminum reduction plant at Mead.

Those who wish to take a bird's-eye view of the Coeur d'Alene mining area and other points of interest within the Inland Empire can join Trip No. 6 which will take the travel-

# PROGRAM

(Continued from page 35)

## Insert Bits at Climax.

C. J. ABRAMS, *Gen. Supt.*, Climax Molybdenum Co.

## Some Insert Bit Experience in the Coeur d'Alene District.

R. R. WEIDEMAN, *Asst. Gen. Mgr.*, Silver Dollar Mining Co.

## Symposium on Single-Pass Bits—

R. S. HOOPER, *Asst. Mine Supt.*, Bunker Hill & Sullivan Mining & Concentrating Co.

J. S. MCINTOSH, *Mine Mgr.*, Zincton Unit, Sheep Creek Gold Mines, Ltd.

G. L. CRAIG, *Dir. of Sales & Research*, Calumet & Hecla Consolidated Copper Co.

Evening: Open.

## Wednesday, September 28

9:00 a.m.—**PRE-SESSION MOTION PICTURE**—"Building a Future"—the story of Coulee Dam.

9:30 a.m. **FIFTH GENERAL SESSION—PUBLIC LANDS—MINES OF THE FUTURE.**

Chairman: EVAN JUST, *Dir.*, Strategic Materials Div., Economic Cooperation Administration.

### Why Revise the Mining Laws?

MARION CLAWSON, *Dir.*, Bureau of Land Management.

Discussion: CHARLES F. WILLIS, *State Secy.*, Arizona Small Mine Operators Assn.

HORACE M. ALBRIGHT, *Pres.*, United States Potash Co.

### Report of Resolutions Committee: Public Land Policy.

### How Mines of the Future Will Be Found.

EDWARD H. WISSER, *Cons. Mining Geol.*, San Francisco.

Discussion: SAMUEL I. BOWDITCH, *Mining Geol.*, American Smelting & Refining Co.

GEORGE M. FOWLER, *Cons. Geol.*, Joplin Mo.

M. H. GIDEL, *Chief Geol.*, North American Properties, Anaconda Copper Mining Co.

WILLIAM E. WRATHER, *Dir.*, U. S. Geological Survey.

### Final Report of Resolutions Committee.

9:00 a.m. **PRE-SESSION MOTION PICTURE**—"No Man Is An Island"—showing operations of the Consolidated Mining & Smelting Co. of Canada.

9:30 a.m. **FOURTH OPERATING SESSION—SAFETY AND HEALTH—NONMETALLIC MINING.**

Chairman: GEORGE H. RUPP, *Mgr.*, Mining Dept., Colorado Fuel & Iron Corp.

### Handling the Underground Dust Problem.

JOHN W. WARREN, *Asst. Ventilation Engr.*, Anaconda Copper Mining Co.

### Advances in Mine Safety in the Lake Superior District.

ROBERT F. WILSON, *Supervisor of Safety*, Oliver Iron Mining Co.

### Nonmetallic Mining in the Northwest.

SHELDON L. GLOVER, *Supervisor*, Division of Mines & Geology, Washington State Department of Conservation & Development.

### Roof Bolting.

E. A. MORGAN, *Mining Engr.*, U. S. Bureau of Mines, Denver.

2:30 p.m. **Group Conferences on Special Problems, Mezzanine Floor, Davenport Hotel.**

(Open to all persons interested)

### Tax Conference.

Chairman: HENRY B. FERNALD, *Chr.*, Tax Committee, American Mining Congress.

### Strategic Minerals Conference.

Chairman: S. H. WILLISTON, *Chr.*, Strategic Minerals Committee, American Mining Congress.

### Gold Producers Conference.

Chairman: DONALD H. McLAUGHLIN, *Chr.*, Gold Producers Committee, American Mining Congress.

7:00 p.m. **ANNUAL BANQUET, Davenport Hotel.**

Toastmaster: DONALD A. CALLAHAN, *Pres.*, Callahan Consolidated Mines, Inc.; *Vice-Pres.*, American Mining Congress.

Presentation of Honor Guests—No long speeches!

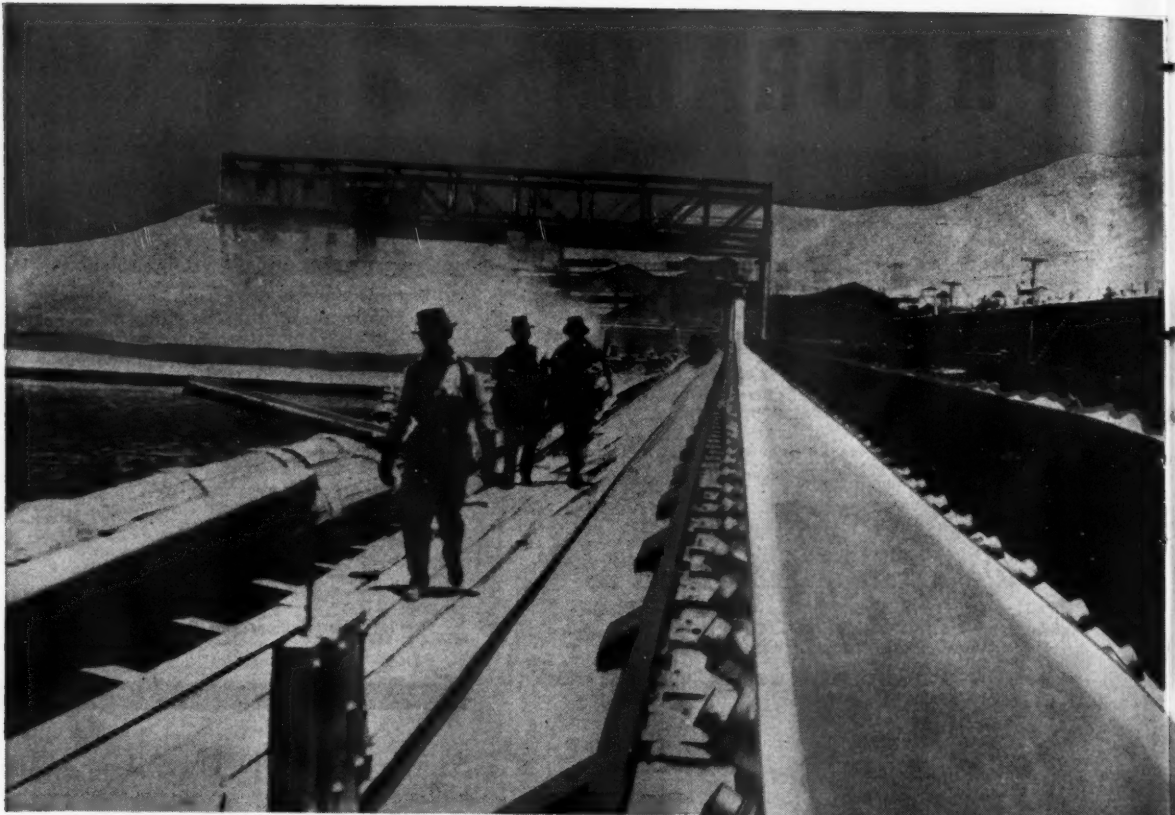
Special Entertainment and Dancing.

ers by plane over Wallace, Kellogg, Metaline Falls, Trail, and on up to Holden in the high Cascades. The return trip to Spokane will be made over Lake Chelan and the Grand Coulee Dam.

An airplane trip, No. 7, will be made on Thursday, September 29, to the Trail operations of the Consolidated Mining and Smelting Co., provided sufficient numbers wish to take this unusually interesting scenic ride, combined with a trip through one of the world's largest smelters.

Trip No. 8, on Friday and Saturday, September 30 and October 1, is intended for those with their own transportation who wish to see the operations of the Howe Sound Co. at Holden, Wash. Those who plan to take this trip can make their own reservations at Chelan. Arrangements have been made for the visitors to see the surface plant on Friday afternoon and to devote Saturday morning to a trip underground.

Solving the imposing and difficult problems that exist today in every segment of the mining industry requires possession of the fullest measure of knowledge. At this great three-day Convention much valuable information will be made available that is basic to meeting the questions arising in all branches of the industry—from drilling and blasting through the various challenges that face management.



*a terrible  
picture  
of a*

**TERRIFIC BELT...**





## THE BLINDING GLARE OF A BLAZING CHILEAN SUN

*ruined this photo but has had little effect on the belt itself.*

In northern Chile, blistering sun blazes the year round. Rubber takes the worst kind of punishment. Yet this U. S. Matchless Conveyor Belt has given continuous trouble-free service since March, 1939.

*The Belt has already carried over 90 million tons of abrasive copper ore. It is expected to carry at least 100 million before replacement.*

Performances like this under the most trying conditions are the result of 3-way engineering-teamwork between engineers representing mine operators, designers of conveyor equipment, and United States Rubber Company.

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*"Best I could do with my equipment" ... was the apology that accompanied this belt photo from Chile ... "The sun was too hot—the glare too bright"—but that's what makes the story behind this belt so amazing.*

This U. S. Matchless Conveyor Belt is 3,100 feet long, 60 inches wide; has plies of 42 oz. duck,  $\frac{1}{4}$ -inch and  $\frac{1}{8}$ -inch covers.

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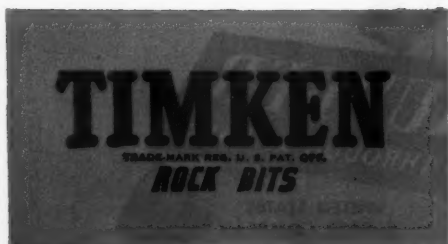
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You're ready for anything when you put this Timken rock drilling team to work.

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Time exposure of five minutes shows lightning strokes discharging from three centers at same time

# Lightning Protective Equipment For Mining Service

## A Report of the Committee on Underground Power Recommending Methods Used to Protect Transmission Lines, Sub-stations and Rotating Machines

By DAVID STOETZEL, JR.

Sub-committee Chairman

IN common with electrical installations in other fields, mining electric equipment should be protected against damage by lightning. A relatively small investment will provide a degree of protection that will result in a material reduction of the possible lightning stresses imposed on rotating machines, and will contribute to an appreciably increased security against failures due to lightning impulse voltages. The importance of such protection is well recognized, for the failure of a machine from lightning may entail repair costs ranging from several hundreds to several thousand dollars in addition to the loss of service while the machine is disabled—in many cases a greater penalty than the cost of repairs.

This equipment is easily installed and requires no maintenance. The fixed charges are insignificant. When it is considered that an appreciable percentage of machine failures have been known to be due to lightning, and that a single machine failure can result in a loss which is far greater

than the cost of protective equipment, adequate protection is plainly low-cost insurance and a sound investment.

In general there are two classes of protection to be considered as follows:

- (1) Protection to the insulation on static equipment such as that on power line conductors, transformers, circuit breakers, etc.
- (2) Protection to the insulation on machine windings such as in generators and motors. This protection is desired both between machine and ground and between turns of machine windings.

Protection of the first class can be obtained by the proper application of lightning arresters alone. Protection of the second class generally requires the use of both lightning arresters and capacitors. Two types of lightning arresters are available and each usually has a particular condition for which it is best adapted or for which it is preferred for economic considerations. These are:

- (1) Line type—Usually the least expensive. (When designed for operating at 15,000 vs or less this type is known as "distribution type." Since this report is general as regards voltage, the designation "line type" will be used to include both distribution type and line type.
- (2) Station type—Sturdy devices for higher capacities and consequently more costly—Usually somewhat better protection.

### General Recommendations

The application of lightning arresters requires making connections to ground in accordance with the sketches herewith. Resistance of each individual ground connection should not exceed five ohms. In some cases it is difficult, if not impossible, to secure a ground connection of the required low resistance and it should be recognized that considerable expense is warranted, if necessary, to establish and maintain a suitable ground connection. If such connections are not appropriately low resistance there is no possibility of securing effective protection—for either personnel or equipment.

Proposed safety rules state: "Effective grounding means that the path to ground from circuits, equipment, or conductor enclosures shall be permanent and continuous and shall have carrying capacity ample to conduct

safely any currents liable to be imposed on it. The path shall have impedance low enough to limit the potential above ground to a safe value and to facilitate the operation of the overcurrent devices in the circuit. Where bonded or mechanically connected track is available such track shall be considered the grounding medium." The track system, properly bonded and effectively grounded, (by connections to suitable ground rods) is usually the most suitable and most generally available grounding medium.

## Application of Lightning Protective Equipment

- (1) For transmission lines, and insulation of other static devices associated with transmission lines:

Apply lightning arresters only,

using line type where the transformer capacity does not exceed 1000-1500 kva and for situations of lesser importance; using station type for larger installations or those of greater importance.

- (2) For stations containing transformers only:

Referring to Figs. 1, 2, 3 and 4, follow the practice outlined in (1) above. A set of arresters, one for each line, should be connected on the line side of the circuit breaker of all incoming and outgoing exposed overhead line feeders. Air insulated transformers, where connected to overhead lines, require the use of line arresters and arresters at the transformer (see note B). The reduced duty on the arrester at the transformer permits effective protection of the transformer insulation.

- (3) For mercury arc rectifier installations:

Referring to Fig. 5. (a) Connect a set of arresters on the incoming lines to the rectifier transformer. The choice between line and station type arresters will depend on considerations of capacity, cost, etc.

(b) Connect suitable arresters in both d-c terminals of the rectifier only if the d-c feeders are exposed to lightning. If one d-c line is directly grounded, omit the arrester on this line.

(Note: A set of "surge eliminators" is always associated with the rectifier transformer. The purpose of these "eliminators" is to absorb high peak surges of small energy associated with mercury-arc phenomena.)

- (4) For synchronous converters:

Referring to Fig. 6. (a) Apply

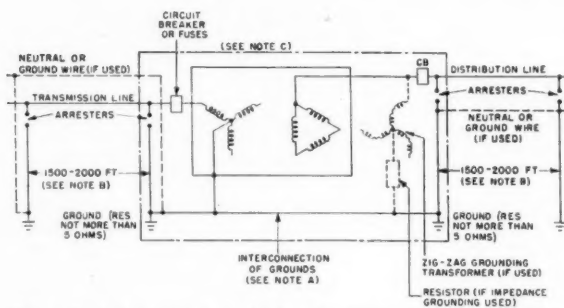


Fig. 1. Typical scheme of protection for transformers connected Y-Δ

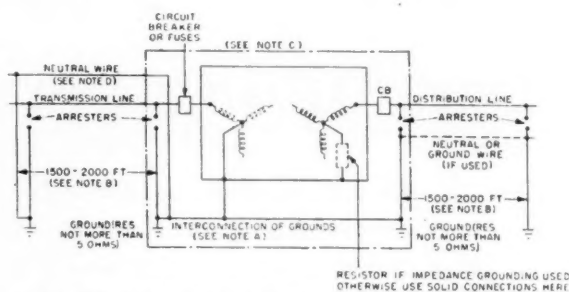


Fig. 2. Typical scheme of protection for transformers connected Δ-Y

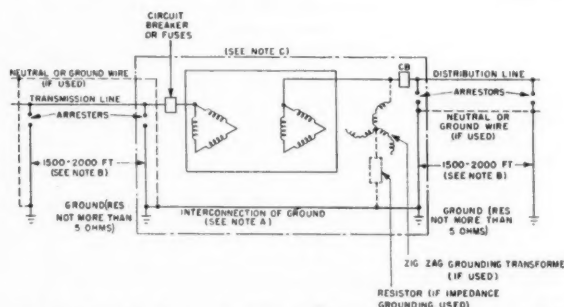


Fig. 3. Typical scheme of protection for transformers connected Δ-Δ

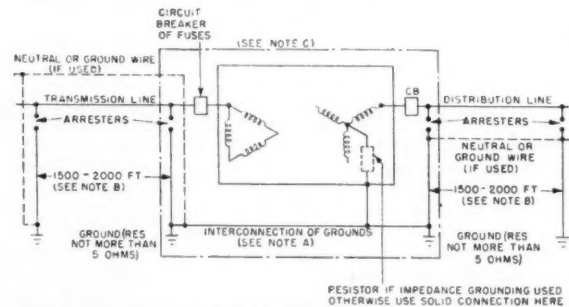


Fig. 4. Typical scheme of protection for transformers connected Y-Y

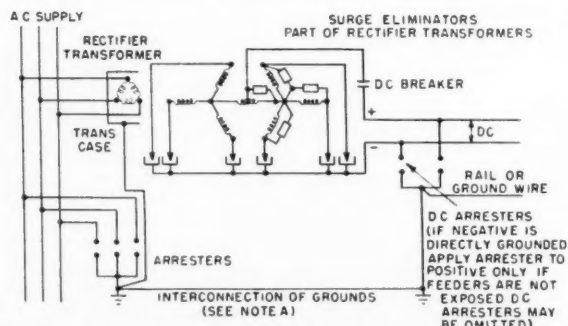


Fig. 5. Typical scheme of protection for mercury arc rectifiers

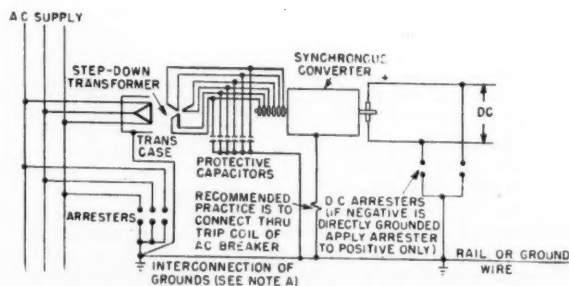


Fig. 6. Typical scheme of protection synchronous converters



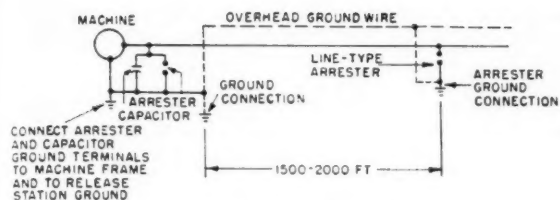


Fig. 7. Typical scheme of protection for machines connected directly to exposed overhead lines

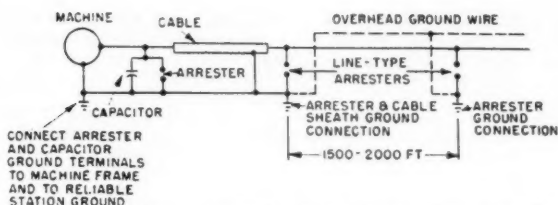


Fig. 9. Typical scheme of protection for machines connected through cable to exposed overhead lines

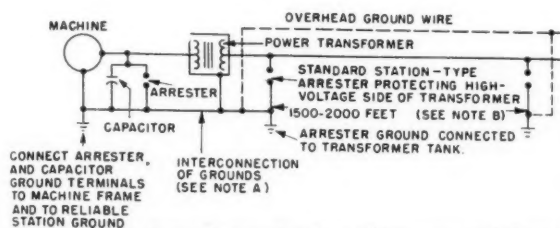


Fig. 8. Typical scheme of protection for machines connected through transformers to exposed overhead lines. Diagram shows arresters and capacitors for protecting high-voltage side of power transformer

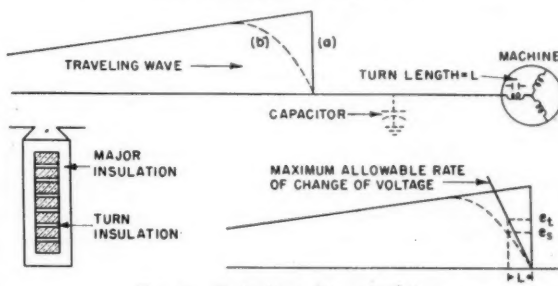


Fig. 10. Protection of turn insulation

lightning arresters as described for mercury arc rectifiers except d-c arresters are recommended even though the d-c feeders may not be exposed, since the windings of converters generally are considered somewhat more vulnerable than a rectifier. As stated for rectifiers, if the negative conductor is directly grounded at the converter the d-c arrester may be omitted on this line.

(b) Apply protective capacitors between transformer and converter.

- (5) For a-c motors and generators directly connected to exposed overhead lines:

Referring to Fig. 7, apply lightning arresters and capacitors as follows: (a) Connect line type arresters on each exposed power line at a point 1500-2000 ft from the rotating machines to be protected.

(b) Connect station type arresters suitable for rotating machine protection on each of the machine terminals or on the station bus.

(c) Connect protective capacitors on each of the machine terminals or on the station bus in parallel with the arresters.

(d) Additional protection against direct lightning strokes can be obtained by installing an overhead ground wire on the pole line for a distance of approximately 2000 ft out from the station. The shielding ground wire should be effectively grounded at each pole structure and directly connected to the lightning arrester and station grounds.

- (6) For a-c motors and generators connected through transformers to exposed overhead lines:

Referring to Fig. 8, connect arresters and capacitors as follows:

(a) Connect station-type arresters on each of the high voltage terminals of the transformers.

(b) Connect station-type arresters suitable for rotating machine protection on each of the machine terminals or on the station bus.

(c) Connect protective capacitors on each of the machine terminals or on the station bus in parallel with the arresters referred to in (b) above.

(d) The installation of the ground wire on the pole line as described in 5 (d) will provide additional protection against direct lightning strokes.

- (7) For a-c motors and generators connected both directly and through transformers to exposed overhead lines:

Follow the practice recommended under (6) above and, in addition, connect line type arresters on each exposed power line at generator voltage at a point 1500-2000 ft from the rotating machines to be protected.

- (8) For a-c motors and generators connected through cables to exposed overhead lines:

Referring to Fig. 9, apply lightning arresters and capacitors as follows: (a) Connect line type arresters on each exposed power line at a point 1500-2000 ft from the line end of the cable and also at the line end of the cable.

(b) Connect station type arresters suitable for rotating machine protection on each of the machine terminals or on the station bus.

(c) Connect protective capacitors on each of the machine terminals or on the station bus in parallel with the arresters.

(d) Additional protection against direct lightning strokes can be obtained by installing an overhead ground wire on the pole line for a distance of approximately 2000 ft out from the station. The shielding ground wire should be effectively grounded at each pole structure and directly connected to the lightning arrester and station grounds.

(e) If cable is over 2500 ft long, and the machine or machine buses are connected directly to it, the cable will serve as the line section, and the set of arresters 1500-2000 ft out on the line may be omitted.

**Note A—Interconnection of Grounds.** Although it is possible to show, theoretically, that interconnection of the high voltage and low voltage grounding systems gives best protection for equipment, and separation of the two grounds at the substation diminishes, in some degree, hazard to personnel, the general practice, by both mining and utility operators, is to interconnect all grounds as indicated in the various sketches.

**Note B—Supplementary Protection for Air Insulated Transformers.** Air insulated transformers, like rotating machinery, when connected to overhead lines, require the use of arresters on the line at a point 1500-2000 ft from the station, as well as at the station. This applies to both the transmission and distribution lines. These "outpost" arresters reduce the duty on the arresters at the transformer to permit effective protection of the transformer insulation. (Not required in the case of liquid insulated transformers.)

**Note C—Apparatus and Equipment at the Station.** All of the parts enclosed by the dot-dash line assumed to be at the station.

**Note D—Y-Y Connected Transformers (Fig. 4.)** It is recommended that Y-Y transformer connections be eliminated wherever possible. This connection is rarely used on account of the difficulty of stabilizing the neutral. If used, it is recommended that the neutral of the transformer primary windings be solidly connected, through a neutral ground wire, to the neutral of the originating machine.

(f) The cable sheath should be effectively grounded.

(9) *For d-c machines:*

Motor driven and prime-mover driven d-c generators as well as d-c motors directly connected to exposed overhead lines, should be protected by suitable d-c lightning arresters. These should be installed at the machine terminals, on the bus or at the station end of each outgoing feeder or tie line. If one of the d-c conductors is directly grounded the arrester may be omitted from this conductor.

(10) *For low voltage a-c machines:*

Although the magnitude of surge voltages and steepness of wave front, in general, are greater on the higher voltage systems and thus low voltage machines are less likely to suffer breakdown, nevertheless the protective measures outlined above are recommended regardless of the machine voltage.

### Supplementary Recommendations

**Overhead ground wires:** The function of an overhead ground wire, strung on the same poles as the power conductors, is to shield the line and to protect machines by draining off lightning charges. If the line feeds a rotating machine, or an air insulated transformer, it is recommended that an overhead wire be installed at least out to the point where a supplementary arrester is installed (1500-2000 ft from machine or transformer). If such a shielding wire is omitted for reasons of economy or practicability, the normal functioning of, and protection afforded by, the capacitors, etc., against surges originating on the line side of the remote set of arresters, will not be affected.

**Location of protective equipment:** It is recommended that, whenever possible, the protective equipment (capacitors and arresters) be so located as to benefit by any existing relay or short circuit protection so that in the event of possible failure of the protective equipment, a bus short circuit would not result. Whenever possible, protective capacitors should be connected directly to the machine terminals.

### Protecting A-C Rotating Machines

In the following there is given a more detailed discussion of some of the factors entering into the problem of protection for rotating a-c machines

and air insulated transformers. There are two phases of the protective problem.

- (a) The protection of the major insulation to ground; accomplished by limiting the amplitude of the applied impulse waves or reflections within the machine windings.
- (b) The protection of the turn insulation; accomplished by reducing the steepness of the wave fronts applied to or reflected within the machine windings.

These objectives are best attained by the proper application of both lightning arresters and protective capacitors. (It is usually considered unnecessary to apply protective capacitors to air-insulated transformers.) To reduce the amplitude of the impulse waves, a set of arresters should be installed approximately 1500-2000 ft from the machines on each directly connected exposed line. For this purpose line type arresters with low IR voltage drop are recommended.

In addition, an arrester suitable for rotating machine protection and a protective capacitor should be connected to the machine terminals. The remote arresters reduce the amplitude of an incoming wave before it reaches the station protective equipment. The station equipment reduces the wave front by charging the capacitors through the surge impedance of the line, and limits the voltage from terminals to frame through the valve action of the arrester.

The action of the arrester in reducing the value of surge voltage provides protection to the major line-to-ground insulation on the machine. Because of this important function this arrester should be of the highest grade and the most reliable obtainable which is the station type. For the smaller or less important installations the less expensive line type arrester may be used at some sacrifice in effectiveness.

The chief function of the protective capacitor, in combination with the station arrester, is to provide protection to the turn insulation on the machine windings by reducing the steepness of the wave front. This sloping of the wave occurs as the capacitor is charged up through the impedance of the line section or transformer. The maximum rate of change of voltage (steepness of the wave front) which can be safely applied to the turn insulation is a function of the strength of the turn insulation and the electrical length of turn.

Referring to Fig. 10, in order to protect turn insulation from a steep wave front (a), the wave must be so sloped (b) that the resultant turn-to-turn voltage stress ( $e_t$ ) for a given

turn length (L) will not exceed the maximum allowable voltage stress on the insulation ( $e_i$ ).

### Machines Connected Through Transformers to Exposed Overhead Lines

Lightning impulses, dangerous to the insulation of rotating machines, can be transmitted through transformers by both electro-static and electro-magnetic coupling, even when the high-voltage side of the transformers is adequately protected by lightning arresters.

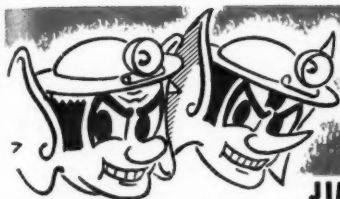
The lightning voltage transmitted by the electrostatic coupling is influenced by the form of transformer construction, particularly the distribution of the transformer windings on the core, by the capacitance of the low-voltage buses, cables, and other parts of the low-voltage circuit, and by the characteristics of the rotating machine.

The wide variation of these factors greatly affects the character of these transmitted surges. In general, the amplitude of voltage electrostatically transmitted may be of the order of 25 percent of the lightning voltage permitted on the high-voltage side of the transformer, and the maximum steepness of the transmitted wave may be practically equal to that appearing on the high-voltage side of the transformers.

The electromagnetic transfer depends on the turn ratio and short-circuit reactance, and kva of the transformer, and on the bank connection. This transfer is not affected by the type of transformer construction, nor is it appreciably affected by the constants of the low-voltage circuit.

By far the greater component of energy is transmitted by electromagnetic coupling and in general the transmitted voltage will be about proportional to the turn ratio; that is, for example, an input voltage of five times normal will be repeated on the secondary side as a voltage of five times normal.

Thus even though connected to the line through transformer a machine may be overstressed by the amplitude or the steepness of the wave, or by both. Best protection will be secured by installing lightning arresters on the lines entering the station and also at the rotating machine (see Fig. 8); although the arresters at the machine are sometimes omitted when there is no exposed line between the transformers and the machine, and the arresters on the high side of the transformers are of a type affording maximum protection. The protective capacitors should be installed at or near the terminals of the rotating machine so that the maximum impedance will be ahead of them.



# COULD THIS HAPPEN IN YOUR MINE?

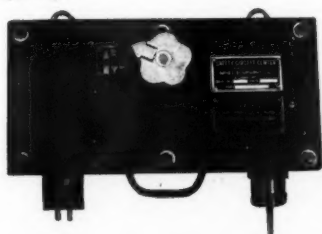
JIM and TIM . . . the Mining Grim—lins Copyright 1949—MINES EQUIPMENT



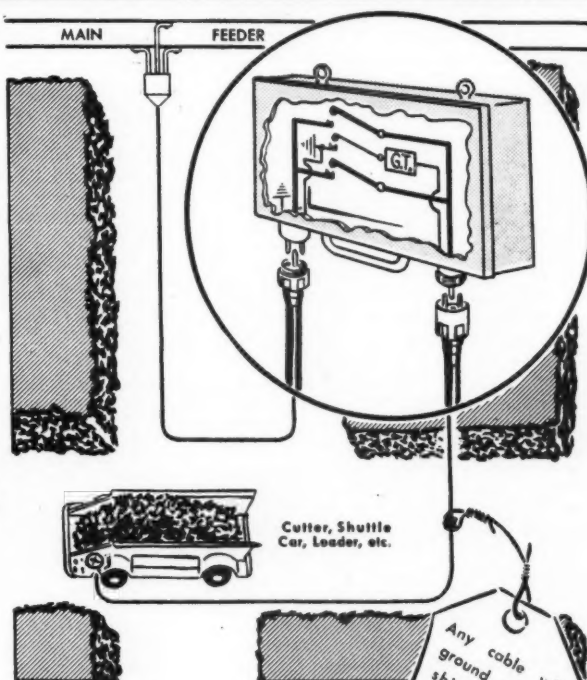
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Suitcase S. C. C. (illustrated) is used to supply power to one machine i. e. Loader, Shuttle Car, etc. It has three breaker poles. Two are for line current . . . the third being wired in series through safety ground trip to the cables ground wire.



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# Controlled Man-Trip Car for Slope Operation

## Automatic Electric Brake Limits Speed and Insures Positive Safety Stop

TOWARD the end of World War II, construction was started on the belt slope Lake Creek Mine of Consolidated Coal Co., near Herrin, Ill. The seam mined is the No. 6, which is 7½ ft high with an average cover from 200-300 ft. At the plant site, the depth is about 250 ft and the slope, originally designed to be on a 12 deg pitch, was steepened at the insistence of WPB to 15 deg in order to save on the length of the belt. The slope has two compartments separated by a concrete curtain wall; a belt-way and a rope-hoist haulageway with track to handle supplies and man-trips. The hoistway ends at the No. 6 seam level—a linear distance of 911 ft from the portal.

A description of this new plant covering the main features of the surface and slope installation was published in the January 1946 MINING CONGRESS JOURNAL, when the construction was nearing completion, and the mine was going into operation. All equipment and methods follow modern good practice. Although man-trips have been successfully handled in and out of the slope by the rope hoist, it was recently decided that there was a need for some better type of positive safety catch on the man-trip car. This presented somewhat of a problem and an examination was made of all available designs.

Wheel brakes, of the band type, are not satisfactory on slopes of 10 deg or greater, and the usual type of "safety dogs" were not readily adaptable. The two more or less standard classes of trip and car stops in general use were not considered satisfactory by the officials of Consolidated. The ordinary drop latch brings the car to a sudden stop with a severe jerk that might catapult the men into the air, and the other type which derails the car, might throw the upper end into the air endangering all riders. Several alternate ways were considered. One was to have a stationary cable between the rails for the length of the slope that would be firmly anchored at both ends, with the braking effort applied on the cable in much the same manner that "grips" are used on surface cable cars. This type of braking

has many undesirable features and did not satisfy the endeavor of the company to design a car that would bring itself to a stop in the case of a rope failure or excessive speed in the hoisting or lowering cycle.

### Electric Brake Designed

Officials of the company studied the application of the so-called electric track brake used on the newer type of city streetcars. As a result, a similar type of installation was specified on the new mine locomotives purchased. These proved so successful that further studies were made which devel-

oped data indicating that a brake of this same design could be successfully applied on the man-trip car. An installation was made accordingly with a typical General Electric track brake, power being supplied at 36 v by storage batteries carried in the car. Charging equipment for the batteries is provided in much the same manner as on the usual automobile or truck and, in addition, there is an auxiliary charging station located at a point on the slope where the car is normally at rest, so that the batteries may be kept fully charged at all times, regardless of the number of trips that might be made during a given period.

Braking action is applied when a fly-ball governor geared to the wheels and connected to an electric control circuit actuates the brakes if the car is operated in excess of a predeter-

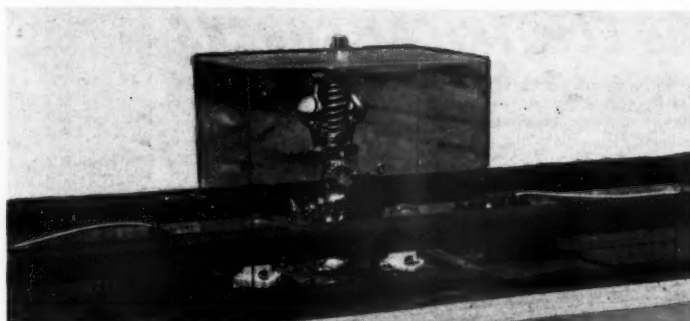


Fig. 1. Speed and stop governor is in full view of riders

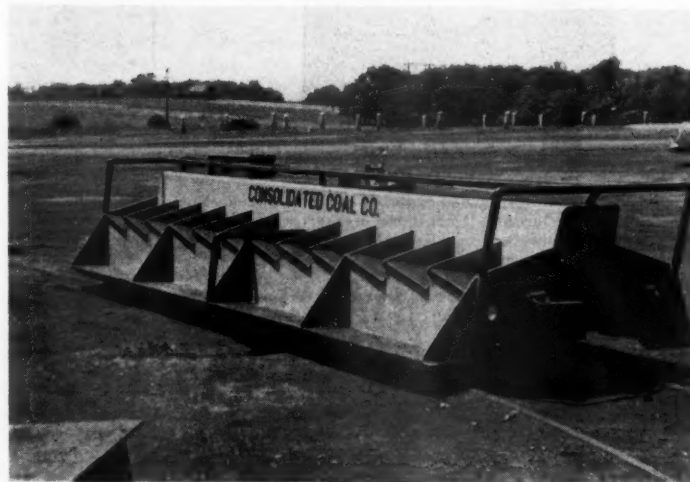


Fig. 2. Safety-braked car seats 24 passengers



mined rate of speed in either direction. This fly-ball governor is located at the central point in the car, enclosed in a transparent case (See Fig. 1). It is realized that a more modern type of governor could be installed and enclosed where it would not be seen, a design which will probably be followed in the later designs. However, for psychological reasons, on the first car it was decided that the fly-ball type in full view would indicate to the personnel just what features were being provided toward their safety.

Excellent results have been obtained in the operation of the brake. The governor brings the car to a stop in some 20 or 30 ft when traveling about 450 fpm. This is comparable to the rate of deceleration obtained when applying emergency brakes on a passenger automobile. There is no tendency to throw the men from their seats and no jerking is experienced between the time of the application of the brakes until the car comes to a complete stop. The total seating capacity is 24 passengers, 12 on each side, so arranged that the men sit on a vertical plane and sideways to the track to enable them to unload in a quick easy manner, should any difficulty arise. (See Fig. 2). Folding brackets may be turned into place to provide a horizontal rest, for use in stretcher cases. (See Fig. 3).

### Complete Control Assured

In addition to the governor control, a stop cord is provided that runs the full length of the car so that the brake can be applied by any rider, should occasion arise, such as a slate fall in the slope or a workman on the track who might not see or hear the approaching car. For a warning and also to give the riders a clear view ahead, lights on the upper end of the car are automatically turned on when it is traveling up the slope and on the lower end of the car when it is traveling down;

To solve the problem of providing safe controls on a man-trip car, technical and operating staffs of Consolidated Coal Co. in southern Illinois devised a unique mechanism which automatically prevents over-speeding and acts as a positive safety stop. Placed in full view of the riders, this governor-controlled apparatus has, in addition to its safety features, a favorable psychological effect.

all lights turn on when the emergency braking is applied.

As a further safety and precautionary feature, the car is equipped with a loud horn which starts blowing immediately upon application of the brakes and remains blowing until the brakes are released after the slack in the rope has been taken up. This measure was deemed necessary in the

event of an emergency stop in the middle of the slope without the knowledge of the hoist engineer. It can be understood that a car with the brakes set would exhaust the batteries after a period, and as the batteries became discharged, the pressure of the brakes would lessen and the car would ease itself to the slope bottom. When the horn sounds, the engineer and every-



Fig. 3. Stretchers can be readily used on this automatically-controlled car



Fig. 4. Man-trip car at slope portal

one else in the vicinity immediately knows that the safety brakes have been applied. Company rules specify that, on such an alarm, a report must be made to the engineer, the top foreman, and the mine manager, who immediately go to the scene and determine the cause of the emergency stop.

This type of "safety stop" has proved so effective that Consolidated has made application for patents on the design. Also, the company is now in the process of constructing a pilot car to be attached to the rope while lowering material into the slope. This will mean that the material cars will be coupled directly to the pilot car rather than to the rope and the same safety features will be obtained in handling supplies as when operating the man-trip car.

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Note, in the comparison below, how JOY EQUIPMENT stands out in its ability to take care of Metal Mine Requirements

JOY	Company B	Company C	Company D	Company E	Company F	Company G	Company H
<b>ROCK DRILLS</b>							
Spaders	YES	YES	YES	YES	NO	YES	YES
Busters	YES	YES	YES	YES	NO	YES	YES
Jack Hammers	YES	YES	YES	YES	NO	YES	YES
Stoppers	YES	YES	YES	YES	NO	YES	YES
Drifters	YES	YES	YES	YES	NO	YES	YES
Drill Jibs	YES	YES	YES	NO	NO	NO	YES
Drill Jumbo (Track)	YES	YES	NO	NO	NO	NO	YES
Drill Jumbo (Trackless)	YES	NO	NO	NO	NO	NO	NO
<b>DRILL BITS</b>							
Carbide Bits	YES	YES	NO	NO	NO	NO	NO
Detachable Bits	NO	YES	NO	NO	NO	NO	NO
Thru-Way Bits	YES	NO	NO	NO	NO	NO	NO
<b>HOISTS</b>							
Single Drum Utility	YES	YES	YES	NO	NO	NO	NO
Single and Two Drum Shaft	YES	NO	NO	NO	NO	NO	NO
Two Drum to 15 HP	YES	YES	YES	NO	NO	NO	NO
Two Drum to 125 HP	YES	YES	NO	NO	NO	NO	NO
Three Drum to 15 HP	YES	YES	YES	NO	NO	NO	NO
Three Drum to 125 HP	YES	YES	NO	NO	NO	NO	NO
Sheaves	YES	NO	NO	NO	NO	NO	NO
<b>CORE DRILLS</b>							
Blast Hole	YES	YES	NO	YES	NO	NO	NO
Exploratory	YES	YES	NO	YES	NO	NO	NO
<b>COMPRESSORS</b>							
Portable	YES	YES	YES	YES	NO	NO	YES
Vertical—Air Cooled	YES	YES	YES	YES	NO	NO	YES
Vertical—Water Cooled	YES	YES	YES	YES	NO	NO	NO
Large Heavy Duty	YES	YES	YES	YES	NO	NO	NO
<b>LOADERS</b>							
Scraper Slides	YES	YES	NO	NO	NO	NO	NO
Mine Car Type	YES	NO	YES	NO	YES	NO	NO
Trackless Loaders (Medium)	YES	NO	NO	NO	YES	NO	NO
Trackless Loaders (Heavy)	YES	NO	NO	NO	NO	NO	NO
<b>MATERIAL HANDLING</b>							
Shuttle Cars	YES	NO	NO	NO	NO	NO	NO
Chain Conveyors	YES	NO	NO	NO	NO	NO	NO
Shaker Conveyors	YES	NO	NO	NO	NO	NO	NO
Belt Conveyors	YES	NO	NO	NO	NO	NO	NO
<b>MINE VENTILATION</b>							
Portable Blowers, Electric	YES	NO	NO	NO	NO	NO	NO
Portable Blowers, Air	YES	NO	NO	NO	NO	NO	NO
Large Mine Fans	YES	NO	NO	NO	NO	NO	NO

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Drilling from special rig equipped with self-contained air compressor

# Suspension Roof Supports\*

## Part II of a Progress Report on This Rapidly Developing Method of Roof Control

By EDWARD M. THOMAS, A. J. BARRY and  
ARTHUR METCALFE,

Engineer in Charge and Mining Engineers, Roof Control Section,  
U. S. Bureau of Mines

**Editor's Note:** Part I of this report appeared in the August issue. It covered the advantages offered by roof bolting and described practices employed in several operations. This part of the report discusses some of the various types of bolts and their installation.

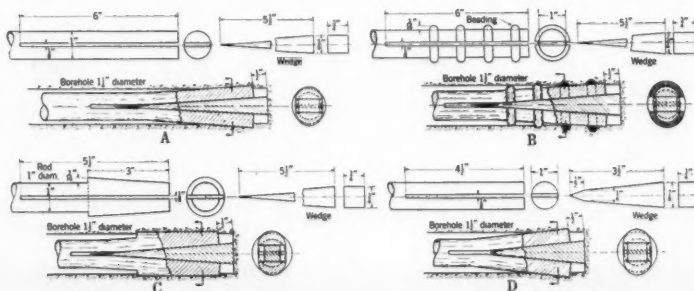
AFTER the length of rod has been determined, the question logically arises, "What type and diameter of rods should be used?" Approximately 95 percent of the rods in use are mild-steel, slit-rod-and-wedge type, 1 in. in diameter. The use of 1-in. rods was not adopted by some companies until after considerable study; some of the factors that influenced acceptance were:

(1) In the fabrication of a rod, the amount of material removed therefrom will not reduce its tensile strength appreciably.

(2) The rod is rigid enough to permit being driven over the wedge with a percussion drill.

Several types of anchoring devices have been examined and tested in the past year; some have been in common use for many years; some of the newer types may be patentable. Many of these devices are theoretically sound,

but most inventors appear to ignore the fact that they must not only equal the time-tested slit-rod-and-wedge type in performance, which is difficult, but must also compete with it in cost. This is especially true of the more expensive expansion-shell type of anchor. The use of the slit-rod-and-wedge type anchorage, however, imposes a limitation on the minimum diameter of the rod, inasmuch as the slot, whether made with a torch or saw, is approximately  $\frac{1}{8}$  in. in width and reduces the effective cross-sectional area of a 1-in. rod by approximately 16 percent; whereas, the cross-sectional area of a rod  $\frac{3}{4}$  in. in diameter is 21.3 percent less than for a rod 1 in. in diameter. No breaks have been reported in the slotted parts



Various types of anchors

\* This report will be published by the U.S. Bureau of Mines as Information Circular 7533.



of rods in the mines of the St. Joseph Lead Co., or in other mines that have recently adopted a similar practice. However, several failures have been reported wherein the rods subjected to excessive loading with sagging strata failed in tension and showed the typical cup-and-ball fracture between the point of anchorage and the bearing plate. As would be expected when a rod is loaded to failure by tightening of the nut at the bearing plate, the threads usually will fail before that part of the rod above the threads will yield and fail.

It is doubtful whether decreasing the rod diameter to less than 1 in. would be practicable. More rods would be required to provide comparable support, and the footage to be drilled would be increased; therefore, the only advantage that could be gained in utilizing a rod of smaller diameter might be more than offset by the greater cost of drilling and the greater number of rods required. Conversely, the desirability of increasing the diameter of rod beyond an inch also is doubtful under ordinary circumstances, because in order to justify the additional steel required it will be necessary to increase the distance between adjacent rods and thus increase the flexure of the roof between them.

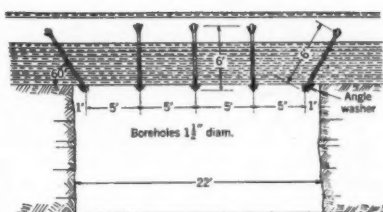
Until methods are developed to overcome the hazards involved, the Bureau of Mines does not advocate recovery of rods in abandoned workings.

## Diameter of Holes and Size of Wedges

Since the Bureau's participation in the program of promoting the use of suspension roof supports it has been believed that clearance of the rod in the hole is important, especially where rods are at an angle with the vertical, for the following reasons: (a) resistance to deflection of the roof beam (constructed by bolting together a number of rock layers) is obtained not

only by direct support with the rods but also by resistance to lateral movement of the alternate rock layers made possible by the bearing of the rod against the sides of the hole; and (b) the less the prongs are spread by the wedge, the greater the bearing area afforded the anchor.

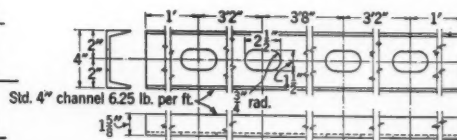
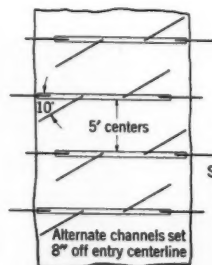
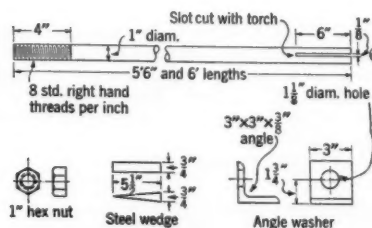
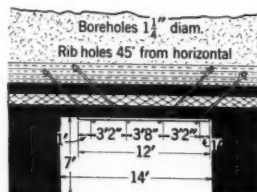
It will be noted that the original successful practice was to drill a 1½-in. diam bore hole to receive a 1-in. rod and a wedge ½ in. thick at its blunt end. In adapting the suspension supports to other rocks, materials of the same dimensions were used. However, during the past several years, carbide-alloy and other special detachable bits 1¼ in. in diameter and larger have been developed, with resultant substantial savings in drilling costs, and most operators wish to take advantage of this. The objection is that it appears to be impractical to manufacture and use these bits in diameters smaller than 1¼ in. and some mining operators prefer 1½-in. bits. A frequently used combination is a 1¼-in. drilled borehole used in



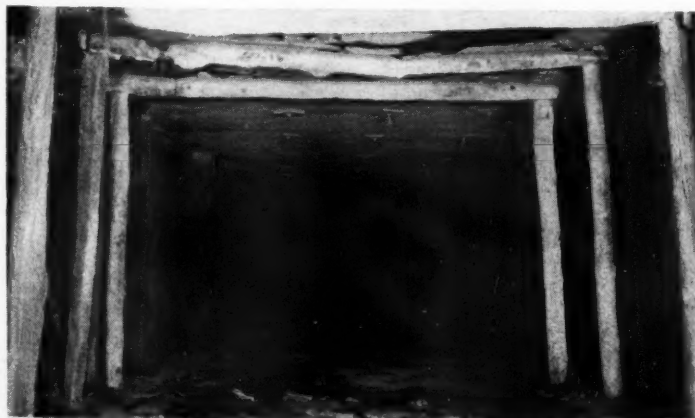
A 22-ft. entry supported by five bolts

conjunction with a ½-in. wedge. When the larger holes are drilled, the following alternatives are presented:

(1) Beads may be welded onto the outside of the prongs to build up the



An angle bolt suspension installation



Transition from timbering to roof bolting on entry

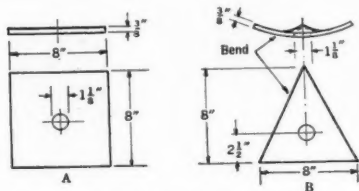
diameter, or the end of the rod may be forged in the shape of a frustum of a cone with the intent that when the wedge separates the prongs the outside surface of the rod will be parallel to the sides of the hole. The former, though successful in the mines of the St. Joseph Lead Co., has been abandoned for use in shales and sandstones because of the tendency of the rod to "hang up" on one bead. The latter method has been abandoned because of the difficulty in maintaining accurate bit gages.

(2) The blunt edge of the wedge can be made thicker; however, this increases the pitch of the wedge unless a longer slot is made and a longer wedge is used. This is an undesirable expediency because of the great difficulty of maintaining the

wedge in the correct position in the slot when the rod is being lifted to the back of the hole. The pitch of the wedge can be maintained without increasing its length by the use of a "stub" wedge. This type of wedge is used in a few mines but not enough experience has been gained to justify conclusive statements about it. It should be noted that if the blunt edge of spread is too wide the resulting angle of spread is likely to weaken the steel at the base of the slot.

### Bearing Plates

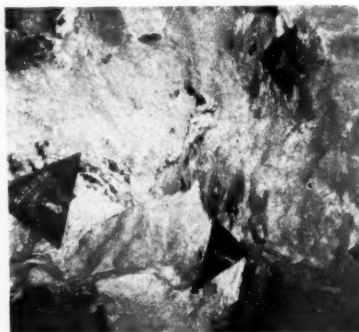
It may be inferred from the designs that the purpose of the channel irons or other continuous bearing plates is not to reinforce or supplement the rods but to provide sufficient plate



Types of bearing plates

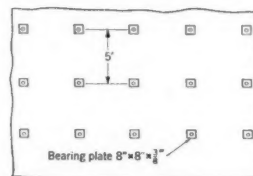
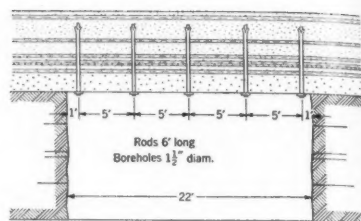
area to prevent spalling from weathering between points where bearing plates are secured. Experience to date appears to indicate that if the immediate roof is reasonably hard, the bearing plate need be only large enough to insure against disintegra-

tion of the rock surface when tension is applied to the rods. In several installations 8 by 8 by 3/4-in. steel is used; at two mines 5 by 8 by 1/2-in. discarded tie plates are used. One company uses a 12 by 12 by 2-in. wood block and the same company frequently uses full-length wood cross-bars as bearing plates at roadway intersections and at room necks.



Triangular bearing plates used in a tunnel

The practice of using wood blocks for the support of roadways having prospective long life is not recommended; the wood is likely to decay, thus releasing tension in the rods which in turn permits flexure of the strata. Recently, several companies that use the "shin plaster" method have adopted the use of triangular bearing plates. These plates



Vertical bolts are suited to provide support under certain conditions

are dished to obtain a tripod effect when an uneven roof surface is supported.

### Tools for Erecting Suspension Supports

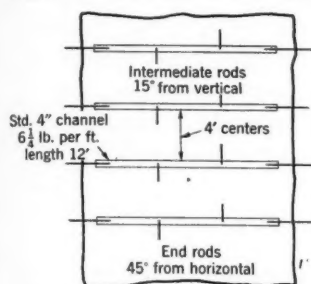
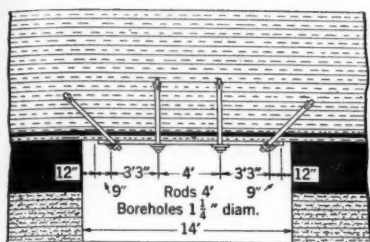
In a few mines it has been possible to drill holes in the roof with electrically driven rotary drills, and it is reported that at one mine an electrically driven percussion drill is giving satisfactory service; but most mines use pneumatic equipment for drilling holes, anchoring bolts, and tightening nuts. Such use presents



Inserting the bolt



Tightening the nut



An installation using both vertical and angle bolts

no particular problem in most metal mines, which usually are equipped to use compressed air. However, compressed air has not been used extensively in bituminous-coal mines in the past. Pneumatic equipment available in a bituminous-coal mine usually consists of a small portable air compressor that serves not more than one or two light, hand-held drills such as used for grading or drilling for overcasts.

The most efficient pneumatic drill for "up" holes is the stoper, an unfamiliar tool in most coal mines but commonly used in metal mines. Stoperes are designed for high drilling speeds and are rated on the basis of 100 cfm at an inlet pressure of 80 psi. Often the available portable compressors are not large enough to do the work required, and this is not discovered until the experimental work is under way, so that the job must be delayed until an adequate compressor can be procured. Therefore, the first thing to be done by anyone contemplating a suspension support project is to determine the adequacy of available compressors.

Stoper drills for use where headroom is 5 ft or more have long been available for drilling "up" holes in hard rock, but until recently no such tool was available for use in places with limited headroom. However, owing to the interest in roof bolting shown recently by many coal mining companies that operate in thin coal beds, several mining equipment manufacturers have placed on the market stopers that can be operated in clearance as low as 21 in.

It has been demonstrated at one large installation that it is possible to tighten the roof-bolt nuts effectively by means of hand wrenches. However, to obtain uniformity in the

bolts, by eliminating variations that occur when the nuts are tightened manually by workmen, and to achieve greater uniformity in installation it is desirable that the nuts be tightened with power-driven impact wrenches, and torque meters should be used from time to time to insure that proper tension is being applied to the bolts. Experimental work is under way to develop a standard procedure for tightening nuts, and the results of these tests will be discussed in a future progress report.

Several companies have constructed special drill mounts to facilitate drilling holes at an angle with the vertical and equipment manufacturers are contemplating designing and manufacturing of various combinations of drill trucks, stoper mounts, compressors, and drilling "jumbos." One company will soon market a combination stoper and impact wrench. A second progress report, planned for early publication, will be devoted to a description of new equipment developed to expedite the erection of suspension supports.

## Adaptation to Cycle of Operations

To take full advantage of the suspension roof support it is necessary to install it at the face as soon as possible after the roof at the face is exposed. It is probable that development of suspension roof supports has lagged because until recently mechanization at the face had not advanced sufficiently to justify making large capital investments for the necessary equipment. Such investments would not have been justified with hand-loading methods. Complete mechanization is accompanied by concentration of mining, and because of the increased productivity of small working areas the investment is now justified. This will become increasingly evident with the development and use of continuous mining machines. How-

ever, it should be emphasized that justification is contingent upon the ease with which an installation may be made without interference with normal mining operations.

In bituminous-coal mining with mobile machines, cutting, drilling, blasting, loading, and timbering usually constitute the cycle of normal mining operations, and up to now no great difficulty has been experienced in installing roof bolts in the time allotted to "timbering" if they are used to supplant conventional crossbars. For efficient use with a continuous-mining machine, it is probable that jumbos will be designed that will permit drilling of roof and installation of supports without the necessity of stopping the continuous machine. In any event, roof bolts should be installed within a few inches of the face before cutting, and any procedure that delays installation should be discouraged.

When a portable compressor must be used, it is debatable whether economics can be affected by a self-propelled unit in combination with a jumbo or stoper mount transported to the face for making installations, or whether the compressor should be installed in a semi-permanent location, the compressed air piped to the face, and the compressor later moved forward when the face has advanced approximately 500 ft. In trackless mining, the former will be the most practicable; in sections where the coal is loaded directly into the mine cars and possible interference with transportation is a factor to be considered, the latter method probably would be more satisfactory.

## Influence on Method of Mining

Two limited experiments in the use of roof bolts along pillar lines have been made in mines operating in the Pittsburgh coal bed. Although sufficient data have not been obtained to

(Continued on page 57)



Roof bolted channels control break at pillar line





Moving a compressor to the quarry

# Aerial Tram Serves Limestone Quarry

Production from Inaccessible Site Made Possible

By FRANK G. FRINK, JR.

Washington Iron Works  
Seattle

NEAR Stevens Pass not far from the summit of the Cascade Mountains is the plant of the Northwestern Portland Cement Co., Grotto, Wash. The plant, located on the Great Northern Railroad, is at an elevation of 850 ft above sea level.

In 1943, when increased production was required, plans were drawn up to abandon the quarry then in use which was located at an elevation of 2650 ft on Crosby Mountain. It was decided to open up a large new limestone deposit on the ridge of Malone Mountain at an elevation of 4300 ft. Both the old and the new quarries are situated in extremely mountainous terrain. The site of the new quarry was particularly inaccessible as vertical cliffs almost completely surround it. Aerial tram haulage was deemed the most economical and, perhaps, the only feasible method of transporting the stone.

The old quarry, served by a continuous bi-cable tramway, did not constitute a serious problem. To serve the new quarry a reversible bi-cable tramway system was selected because of the large capacity required, the distances involved, plus the need for moving many heavy pieces of equipment on the tramway to the new quarry site.

Severe winter weather is encountered in the Cascade Mountains above the 3000-ft elevation. The total yearly snowfall will approximate 100 ft

★ ★ ★

Rather than rely upon a flock of eagles or a herd of burros to solve its transportation problem, the Northwestern Portland Cement Co. has installed an unusual aerial tram. Of special interest is the manner of construction of the long span of 3000 ft with a difference in elevation of 1100 ft below the two ends.

★ ★ ★

with an average ground depth of 15-20 ft. In February 1949, a ground depth of 21 ft of snow was checked at the upper tram terminal. All construction requires special reinforcing to withstand the weight of such considerable depths of snow.

Heavy rainfalls during the late spring and early fall require large ditches to carry off the water, and keep forest access roads in operating condition. Such climatic conditions dictate operations of the quarry for about five months yearly, from about June 1 through October. Operation of the quarry and tram during the five months period will furnish sufficient rock to keep the cement plant adequately supplied for a year's time.

Contract for the construction of the



Looking down from upper terminal



new aerial tramway was let to the Washington Iron Works in Seattle during the summer of 1945. In the short period of summer weather remaining that year, a camp was constructed at the 1850-ft elevation, a three-mile access road was built to midpoint of the two-section tram at 2950-ft elevation, and heavy timber was logged off the right-of-way.

Preliminary work was done over trails with pack horses and later carried on with four-wheel drive trucks on roads with grades ranging from 15-20 percent. Work proceeded on the basis of a four-month year and final erection details were completed in late 1948 and the tram was placed in operation. Many difficulties in material handling were due to the extreme ruggedness of the region. With a single span of 3000 ft and a difference in elevation of 1100 ft between the two ends of the cable, special rigging equipment was required for stringing the 1 3/4 in. cables across the canyon. All sand and gravel, cement, and water was hauled across the pioneer line to pour a 400-ton concrete anchor imbedded in solid rock for the upper cable anchorage.

Preliminary hoisting was accomplished with a gypsy-type, gasoline-powered hoist using an endless line. The first cable across the canyon was 3/4 in. in diameter. It was carried by pack horses to the top and then strung back down over the cliffs by hand. The cable was run through a rigging at the top and the hoist at the lower end hauled successively larger cables across the span.

### High Capacity Tram Cross-head

An hourly tonnage of 150 tons of 4-in. size rock can be carried by the new tram. The two 3000-ft sections of the new tram connect into the existing tramway at the 1800-ft elevation. The total tramline distance from the new quarry into the plant is 13,000 ft. In this length there is a drop in elevation of 3450 ft and two changes in direction.

Each section of the tramway is of the reversible bi-cable type using two five-ton capacity automatic dumping buckets operated by gravity at a speed of 1000 fpm. The braking effort is provided by regenerative control of 150-hp, double-drum electric hoists at the upper terminal of each section.

Because of restricted working space, these hoists are located immediately behind the bins. The drums are 96 in. in diameter by 96 in. long and are designed to handle the lowering rope in two wraps. Spotting over the bins is facilitated by the use of a tail rope.

Although the upper section is a single span of 3000 ft with each

*(Continued on page 60)*



Upper terminus of the 3000-ft span. Face of quarry is shown in background



Top section of tramway, 3000 ft long, spans deep wooded canyon



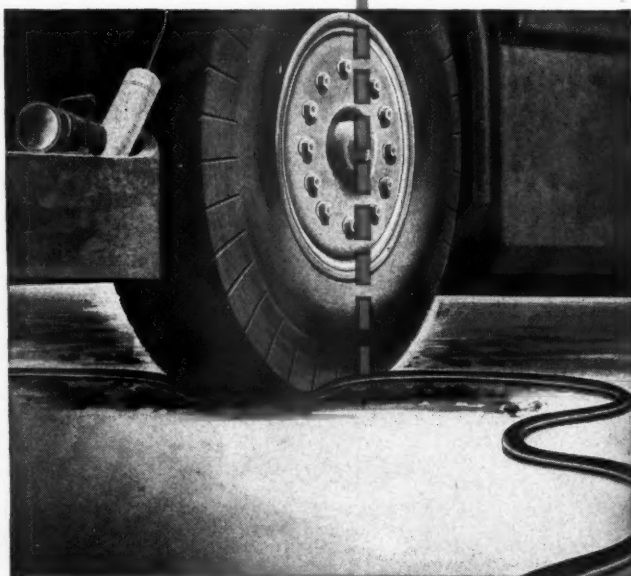
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## Suspension Roof Supports

(Continued from page 53)

Motion made that the convention re-established that the roof bolts did not interfere with orderly caving. Channels and bolts supporting an entry roof in the Pittsburgh coal bed were installed during development of the entry. The bolts consolidated the immediate roof, which broke readily with the main roof when the cantilevered material of the main roof caved. It is particularly desirable to apply this method of support in areas where a great amount of roof-and-floor convergence occurs in the vicinity of pillar lines. Under such conditions, conventional timbering is very costly and often ineffective in preventing the immediate roof from breaking up prematurely. Several companies in widely separated localities that are confronted with such a problem are preparing to make large scale experiments with combinations of roof bolts

and rows of conventional wooden breaker posts next to the goaf.

Another indication of the influence of the roof bolting upon future mining methods may be inferred from the experience at one metal mine. A slabbing method for widening rooms is used at this mine, which has a strong but thinly bedded shale roof, and slusher hoists with scrapers are used to load the ore. When wooden posts or stulls were used for support, it was found that the rooms could be slabbed safely for a total width of only 35 ft because blasting and the necessity for clearance for the scraper prevented installing enough stulls to support the immediate roof properly. After the roof bolts had been adopted in this mine, an experimental room 200 ft long was slabbed to a width of 110 ft before failure occurred.

### Conclusion

Roof bolting offers the mining industry a safe, efficient method of roof support. The method has been applied extensively under widely different roof conditions and affords the

possibility of developing new and more efficient methods of mining. Many questions regarding the theory and application of this type of support cannot be answered definitely as yet. Present knowledge indicates that it is not a "cure-all" for all types of roof conditions, nor can a method that is successful in one mine be assumed to be safe for another without careful study and closely supervised experimentation under controlled conditions.

The Bureau of Mines, in cooperation with several mining companies and State agencies, is carrying on a program of research and investigation not only on problems involving roof bolting, but also on the broader subject of roof control in general. As part of this program, one or more Bureau specialists in roof control have been assigned to each district and subdistrict office of the Coal Mine Inspection Branch, Health and Safety Division, Bureau of Mines. These men may be consulted by applying to the supervising engineer of the nearest district office or the engineer-in-charge of the nearest subdistrict office.

## U. S. Treats Lower Grade Ores

John D. Sullivan, assistant director of Battelle Institute, speaking before the UN Scientific Conference on the Conservation and Utilization of Resources pointed out that U. S. industry is being forced to use ores containing a smaller and smaller percentage of desired minerals. He referred, at the same time, to U. S. technical developments which make utilization of low-grade ores feasible.

"The average yield of copper from a ton of ore today is less than 20 percent of what it was around the turn of the century. . . . There is a like trend in the U. S. for lead and zinc.

"Formerly, it was not practical to mine lead ores containing less than 5 to 7 percent of lead. But in recent years, mines in Southeastern Missouri have profitably worked with ore containing as little as 2 percent of lead. The Southeastern Missouri ores of St. Joseph Lead Co. had a lead content of 3.5 percent in 1930 contrasted to about 2.25 percent today."

Speaking of the Tri-State District, Mr. Sullivan remarked that the ores mined formerly contained about 6 percent of zinc, 1 percent of lead while the combined percentage, today, is now down to about 4 percent.

He remarked that our reserves of high-grade iron ores is not inexhaustible and, as time goes on, the U. S. will depend more and more on the "formation materials" as a source of iron. The tonnage of processed ores has grown from nothing in 1906 to nearly 12,000,000 tons in 1946.

Similar activities in treating lower-grade ores exist in the production of manganese from domestic ores. The Anaconda Copper Mining Co. is now getting a product containing about 60 percent of manganese from a carbonate ore. Mr. Sullivan predicted that the future will see large scale commercial application of resinous materials in the recovery of metals or by-products from waste solutions. "The ion-exchange resins have already

been employed commercially for the separation of fissionable elements and also the rare earths."

Mr. Sullivan asserted that the new developments yielding lower cost operations have aided a great deal in permitting the economic use of lower-grade ores. He mentioned Heavy-Media Separation, the Dutch States Mines cyclone, and the Humphreys spiral in addition to improvements of methods in flotation.

## Mine Haulage Accidents

Reporting on accident rates in underground haulage, Alan A. Sharp, mining engineer, Safety Branch, U. S. Bureau of Mines, states in *Pay Dirt* that rates have not improved since 1931. He called attention to the fact that hand tramping is generally the only means of haulage in small mines, although the present economical limits of hand tramping are lower than those existing in the past.

Lost time accidents in underground haulage, including those with electric locomotives, accounted for about ten percent of the total accidents in the period 1931-42.

Strained backs, hernia, injuries to hands and arms, and occasional head and foot injuries comprised the bulk of accidents caused in underground haulage. Proper car maintenance can eliminate many injuries, as easy dumping cars that roll easy are not only safer, but are more efficient.

Mr. Sharp pointed out that gasoline locomotives should never be used in

underground mines. He stressed the importance of clean, well-graded haulageways, and properly serviced rolling equipment as the first step towards lowering the rate of mine haulage accidents.

## Face Equipment in Metal Mining

Thirty years ago, to advance a drift heading, the equipment required consisted of a few shovels, picks, and other small tools valued at \$50. A hand crank Leyner drill with arm and column, valued at \$500, and a few mine cars trammed by hand completed the face equipment in general use at that time.

Today a modern drift crew uses a \$2800 mechanical mucking machine, and an \$800 automatic feed Leyner drill, a \$200 cherry picker, a \$2000 jumbo, and \$3100 storage battery locomotive; a total of \$8900 in comparison to the \$600 considered adequate in 1939. One large, deep lead-zinc mining company has an equipment investment of approximately \$30,000 for each working face.





Falls of roof and coal account for greatest percentage of coal mining accidents. Set safety posts for accident prevention

# How Safety Maintains Output

## On-the-Job Training for Production With Safety

By A. H. ZEILINGER

Safety Engineer  
Colorado Fuel and Iron Corp.

SOMETIME ago, in a nation-wide poll, industrial supervisors were asked, "What are the things you are responsible for?" Nearly all gave as their first-place answer, "Production." How can the slogan, "Safety First" be followed when the supervisors feel that production is first? Accepting their point of view, it is obvious that anything that interrupts production is of vital importance to the supervisor.

Production may mean getting out ore, supplying transportation, or it may mean operating mechanical equipment. Anything that interferes with that work slows production and the supervisor will definitely be interested in preventing that interruption. Illness and absenteeism may

curtail output but a far greater interruption to production may be caused by accidents that not only take the worker out of the production picture, but may also cause serious damage to machines, equipment, morale, or materials. The successful supervisor must stop accidental causes of interference with production.

Sometimes supervisors make remarks like these: "I know what my men should do to prevent accidents, but I can't get them to do those things." "I've told them a dozen times—what more can I do?" "What more do you expect of me?" When a supervisor talks like that, he most likely does not associate the prevention of accidents with production. He thinks

safety is something separate and apart from production.

If that same supervisor has production problems, he knows how to get things done. If he wants some holes drilled in a plate and the operator says he'll punch those holes in the plate, the holes will be drilled. Likewise, if that supervisor wants some

**Putting safety to work to reduce production losses caused by accidents is a problem which can be licked by competent education and training. Application of the principles outlined on these pages can accomplish a great deal towards the objective of accident prevention.**



Ride the belt only when it is free from materials and running slow



place timbered with a full set and the worker says that he'll throw in a few posts, the full set will be placed. The supervisor, realizing that the substitute ways would interfere with production, will not accept that interference. He knows that wrong conditions and wrong doing will eventually cause trouble.

Accidents and injuries definitely result from the same cause—wrong doing. An injury or an accident doesn't happen every time something is done wrong, nor does an injury accompany every accident. But if these wrongs are tolerated and are permitted to continue, all that is necessary for an accident to happen is to give it time. Then the supervisor will want to see that things are done in the proper way, so that disrupting accidents may be avoided.

Reduction of accidents is a problem that may be approached in the same manner as those of production. All the supervisor needs to do is use the qualities he has. How did he get the holes drilled when the operator wanted to punch them? How did he get the full set placed when the operator wanted to use posts? He got these things done in the proper way because of his knowledge of efficient production methods.

Efficiency in production and accident prevention go hand in hand. What affects one affects the other. The causes of production losses and the causes of accidents are the same—doing things in the improper way. Using the wrong tool to do a job causes a loss in production. It also causes accidents. Then, why not see that the proper tool is used? It will help production, and it will help prevent accidents.

### Accident Causes

Preventing accidents doesn't mean eliminating only accidents which cause injuries, damage to machines or equipment, or spoilage of materials and loss of time. It means all accidents, whether or not they cause injuries. Any supervisor who is going to prevent accidents must know the causes; these may be classified under two general headings: faulty environment or faulty human behavior. More specifically these causes are:

- (1) Inadequate guarding
- (2) Defective tools, equipment, or material
- (3) Hazardous arrangement
- (4) Improper illumination
- (5) Improper ventilation
- (6) Unsafe dress or apparel
- (7) Faulty mental or physical condition
- (8) Lack of knowledge or skill
- (9) Wrong safety attitude

When one or more of these causes result in an accident it shows that

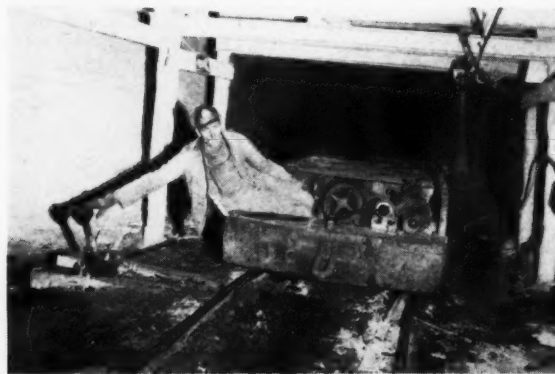
something is wrong. Someone failed to do his job in the right way or some wrong condition was allowed to exist. In order to prevent recurrence of the accident, the cause must be found and corrective action taken. The supervisor should know the hazards of his work, but of course, when put on new work he has the hazards of the new work to learn. This may be done by:

- (1) Investigation of accidents
- (2) Study of plant experience
- (3) Study of other plants' experience
- (4) Inspections
- (5) Suggestions
- (6) Job analysis
- (7) Using safety department

The supervisor controls the person—

Three steps in training miners to set props safely





There is a safe and a dangerous way of throwing a switch. Cultivate safe working habits

nel, and it is his job to instruct each worker or have him instructed how to do the job safely and then see that his instructions are carried out.

### Job Analysis Method

In every job analysis, each step of doing the job is noted. All parts of this job should be analyzed for possible hazards; any way at all in which the worker could get hurt. The hazards for each step should be noted and a remedy sought and applied. The instructor should ask himself in every detail of the job analysis if the worker could get hurt; then he must ask what can be done to prevent injury, and make the required changes. If the supervisor finds hazards and their remedies, and then does nothing about them, not one iota of good will come from his effort to prevent accidents. A proper follow-through is imperative, and it is equally important to check and recheck to see that workers follow instructions.

In making a job safety analysis, it must be remembered that close study of the movements of the worker, the work areas, the housekeeping, materials, machines, tools, and clothing must be made. In doing so, the questions, "Can the worker be injured?" and "What can be done about it?" must be continuously in mind. Vigorous, intelligent, and continuous application of remedies for hazards is the key to preventing accidents and the means of keeping such interruptions out of production.

The job analysis may use some classification as the following:

Major Type Operation	Minor Type Operation	Steps	Technical

If we were making a job analysis for a lathe operation, we would place in the column headed, "Major Type

Operation" the word "Lathe Operation." There are many minor operations to running a lathe, so one minor operation at a time is considered. Then all the steps of that minor operation, such as "chucking up a job," would be listed; then all the technical points would be noted. That would constitute the job analysis for "chucking up a job" in a lathe.

From this job analysis the job safety analysis may be made. To each step is added any hazard that might cause an injury, and then a remedy for each hazard is provided so the injury will not occur. Supervisors use this safety analysis and make certain that the remedies are applied. For example, in "chucking up a job" in a lathe, one hazard sometimes found is that the chuck wrench is left in the chuck. The remedy to prevent

the accident of the wrench flying out when the lathe is started is to make certain the wrench is removed immediately after each use. Checking and rechecking is necessary to see that the remedy is always applied.

At this point, the question arises, "What is the best method to instruct the worker?" A good method is the one used during the war with the general steps—preparation, presentation, performance, and follow-up.

When the job analysis and the job safety analysis are made, they can be retained and used time after time in instructing and training the new worker or the old worker on a new job. Then, if vigorous, intelligent, and continuous effort is applied, "Lack of knowledge and skill" won't be stated as the cause of so many accidents.

## Aerial Tram

(Continued from page 55)

bucket operating over two 1½ in. diam smooth coil track strand cables, the lower section, of the same length, has seven intermediate towers. Each section is operated at the upper end by one hoist man. Air operated chutes load the buckets.

Heavy timber with steel superstructures was used in construction of the loading and the discharge bins. The crushing plant conveyor system and bins at the top point are completely roofed to operate during bad weather and protect the structures from heavy snows.

Transmission lines carrying power at 2300 v, 60 cycle, 3 phase, are carried above the tram cables on the lower section with masts on each tram tower. On the upper section a 1½-in. cable spans the 3000-ft gap to act as a suspender line for the three power cables. Capacitors have been installed at different stations for power factor correction. Operators can communicate with each other by telephone.

The highest point of the tram is the upper terminal which ends on a small

promontory. From that point a 1200-ft road with a six percent down-hauling grade was blasted around the mountainside to the quarry face. Rock is handled from the face, quarry-size, to the primary crusher by 8-cu yd capacity Mack trucks.

The quarry has a narrow working face and extends about 400 ft in elevation up to the top of the ridge and over. A series of benches are blasted by the customary quarrying equipment to provide the limestone. A 1½-cu yd Diesel shovel loads the trucks. All this equipment, including the complete crusher plant, bunkhouse and cookhouse, material and accessories, was transported over the 3000-ft span with the aid of special rigging and hoisting machinery. The largest piece handled was 13 tons—the crusher base. Close cooperation was maintained between the contractor and the quarry department of the cement company as the quarry was being opened at the same time as the construction of the tramline. The success of the joint operation is, in a large measure, due to the splendid coordination of the work by Jim Halleran, quarry superintendent, and Frank Baldwin, plant superintendent.

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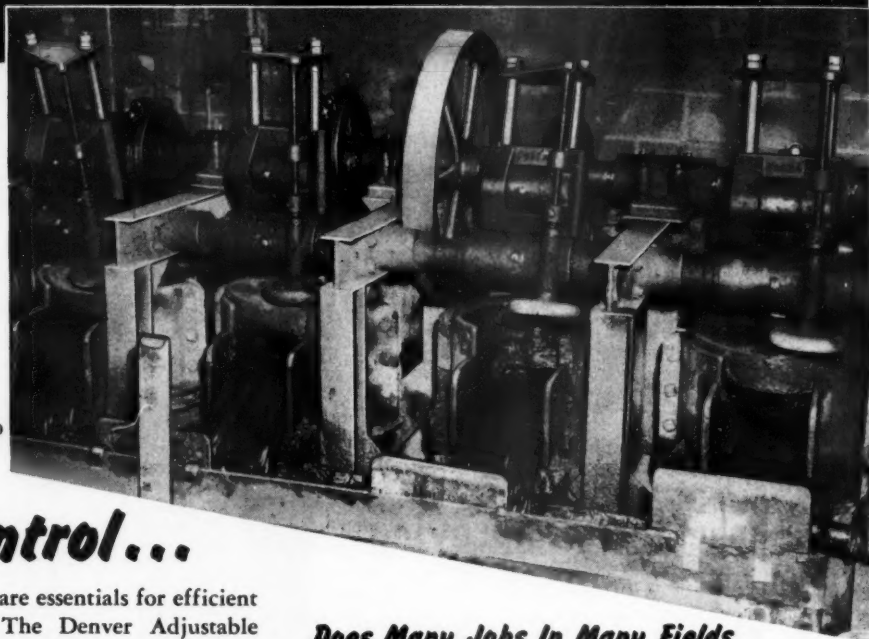
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# WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

CRITICAL of the delay in adjournment caused by the logjam of bills in the Senate, the House is taking a series of recesses until September 21 and all but a skeleton force of the Representatives have returned to their home districts. Remaining for disposition are bills on minimum wage, reciprocal trade, military assistance to Europe, liberalization of the displaced persons law, farm legislation and military, Government and executive pay bills. Administration leaders have rejected a suggestion that the reciprocal trade agreements law, in the form in which it expired June 30, be extended for one year. They expect to drive for a three-year extension of the law and for the removal of the restrictions put into it by the 80th Congress, which provide that the Tariff Commission shall set "peril points" below which duties cannot be cut without a public statement as to such action.

## Wage-Hour

The Senate has passed a Wage-Hour bill which would increase the minimum wage to 75¢ an hour, broaden coverage of the Act, centralize administrative functions in the Secretary of Labor and permit him to sue on behalf of employees for back wages. Several minor amendments were added on the Senate floor, including a limitation of the number of employees of retail and service establishments similar to the provision of the House-passed bill.

House approval of its wage-hour bill came on August 11, when the measure by Rep. Lucas (Dem., Tex.) was substituted for the Administration version by a vote of 361 to 35. The bill carries an increase in the minimum wage to 75¢ an hour and includes language which would narrow the application of the law to remove an estimated 1,000,000 workers from coverage. The bill contains the corrective provisions of the Overtime-on-Overtime Act, expanded to exclude payments to a trustee for welfare

and retirement funds from the regular rate of pay. Also excluded from hours worked is "any time which was excluded from measured working time during the week involved by the express term of or by custom or practice under a bona fide collective-bargaining agreement applicable to the particular employees." The Administrator is authorized to supervise the payment of the unpaid minimum wages or the unpaid overtime compensation owing to any employee under the minimum wage or maximum hours section of the Act, "and the agreement of any employee to accept such payment shall upon payment in full constitute a waiver by such employee of any right he may have . . . to such unpaid minimum wages or unpaid overtime compensation and an additional equal amount as liquidated damages." The bill does not authorize the Administrator to institute suit for payment. Exemptions of employees employed in bona fide executive, administrative or professional capacities (as defined by regulations of the Administrator) or in local retailing capacity, or in the capacity of outside salesmen are continued. Any employee employed by any retail or service establishment, more than 50 percent of which establishment's sales are made within the State, is exempt.

The Senate and House versions of the bill will undoubtedly go to a conference committee to adjust the differences.

## Delivered Pricing

While Committee staff members have been instructed to draft suitable language to compromise the Senate-House versions of S. 1008, the delivered pricing and freight absorption bill, the conferees from the two Houses have deferred action until September 21. Chief difficulty with which they have been struggling is the Carroll (Dem., Colo.) amendment which, in effect, bans the "good faith" defense against charges of illegal use

★ ★ ★ ★ ★ ★ ★

## Washington Highlights

**CONGRESS:** House marks time till Sept. 21.

**WAGE-HOUR:** Senate passes bill.

**DELIVERED PRICING:** May hang in conference.

**SOCIAL SECURITY:** 200-page bill would expand coverage.

**COAL MINE INSPECTION:** Neely bill on Senate calendar.

**INCENTIVE PAYMENTS:** O'Mahoney bill reported to Senate.

**STOCKPILING:** Appropriation reduced.

**IMPORT DUTIES:** Seek restoration of copper import tax.

**UNION MONOPOLY:** Committee concludes investigation.

★ ★ ★ ★ ★ ★ ★

of freight absorption. Opponents of this House-imposed amendment charge that it would renew confusion over the use of basing points and delivered prices.

## Social Security

No further action is anticipated in the present session on the Social Security bill, H. R. 6000, reported by the House Committee on Ways and Means August 16. Provisions of the 200-page bill would add around 11,000,000 persons to the 35,000,000 now covered by old-age and survivors' insurance. Included in these additions are non-farm self-employed persons, State and local government employees, domestic servants, employees of non-profit institutions, agricultural processing workers, certain Federal employees, salesmen, industrial houseworkers, contract loggers, mine lessees, and other persons technically not employed at common law "who were deprived of status as employees" by the Gearhart resolution of the 80th Congress. The 2,500,000 persons already retired or their survivors would have their present benefits increased by 70

percent; and those retired in the future by an average of 80 percent. Federal participation with States in public assistance or home relief would be increased by \$160,000,000 annually. Totally and permanently disabled persons would be placed under both the insurance and public assistance programs. Total annual earnings on which benefits would be computed would be increased from \$3,000 to \$3,600. The combined employer-employee's payroll tax rates for the future (present combined rate is 2 percent) would be: 1950—3 percent; 1951-59—4 percent; 1960-64—5 percent; 1965-69—6 percent; and 1970 and after, 6½ percent. Self-employed persons covered by the proposed law would pay three-fourths of these rates.

### Coal Mine Inspection

The Neely (Dem., W. Va.) and Price (Dem., Ill.) bills, S. 1031 and H. R. 3023, which would grant police powers to Federal coal mine inspectors, remain in the same legislative status as discussed in the August JOURNAL. The Neely bill has come up three times in the Senate on calendar call and has met objection and been passed over. Conceivably it could be passed at any time. The Price bill is pending before the full House Committee on Education and Labor after a favorable report from the Kelley (Dem., Pa.) subcommittee which conducted hearings.

These bills may get no further in the present session, but will retain their legislative status in the second session when the 81st Congress reconvenes in January.

### Incentive Payments

A rewritten O'Mahoney (Dem., Wyo.) bill, S. 2105, was reported to the Senate August 23. At the same time Senator Murray's bill, S. 240, which is the same as Rep. Engle's measure H. R. 976 (now pending in the House Rules Committee), was reported to the Senate without recommendation.

Senator O'Mahoney's new bill would provide for: (1) exploration aid to mining enterprises, through contribution by the Government to the cost of projects found to offer "reasonable promise of developing unknown or undeveloped sources of metals or minerals"; (2) conservation aid to particular mining properties, through Government contribution to the cost of maintaining them in standby condition; and (3) conservation aid through Government purchase of the product of such mines at prices which would enable them to continue in production. Conservation aid would be accorded only where production would otherwise be discontinued, or remain discontinued, under such circumstances that it probably "would not or could

not be resumed when needed for the national economy or security."

The measure would create a "Minerals Conservation Board" consisting of the Secretaries of Interior, Defense, Commerce, and Treasury, with full authority to determine the allocation of whatever funds are appropriated, as between exploration and conservation payments and as between various minerals or groups of minerals. The Board could fix maximum or minimum purchase prices to be paid; maximum or minimum amounts to be paid for maintenance of mining properties; maximum or minimum amounts to be paid for exploration for any mineral or groups of minerals, and the proportion of the cost to be paid by the Government; the particular minerals (and specifications therefor) to be eligible for conservation aid and for exploration aid, and the time limits on Government contracts entered into for this purpose.

All metals and minerals purchased would be received by the Administrator of General Services and could then be acquired by the Munitions Board

for the national defense stockpile. Otherwise the Administrator would sell them in the open market "if and when open-market prices will return to the Government at least the price paid by the Government for the metals or minerals, and only in such quantities as will not depress the market."

The Committee report states that "cogent evidence" had been presented that tax allowances for exploration and development costs are an effective means of attracting much needed venture capital into mining. The report recommended that the appropriate Congressional Committee undertake a study of the possibility of providing tax incentives for the domestic mining industry, but in so doing said: "However, it realizes the impossibility that any such action can be taken, or that its effects would be felt, in time to deal with the present emergency situation in respect to domestic sources of essential minerals and metals."

Meanwhile, the bill, S. 2320, introduced by Senator Pat McCarran of Nevada and 21 other Western Sen-

(Continued on page 85)

### "Why Not All Tribes Use-um One Kind Wampum?"



—The Washington Post



# Personals

The Armco Steel Corp. of Middletown, Ohio, has announced the following organization changes: Charles W. Connor, manager of the mining division, has retired from active management of the division but will continue



CHAS. W. CONNOR

to serve on a consulting basis. C. O. Kane has been appointed general superintendent of the mining division. Mr. Kane joined Armco in 1943 as general foreman at the Montcoal No. 1 Mine. Samuel P. Carter has been appointed superintendent of maintenance of the mining division. Mr. Carter joined Armco as an electrician at the Nellis Mine in 1934.

James Douglas, secretary of Phelps Dodge Corp., was named chairman of the subcommittee on minerals for the committee which helped arrange the United Nations Scientific Conference on Conservation and Utilization of Resources which met August 17 at Lake Success.

W. H. Moore, in addition to his other duties, has been designated superintendent of the mining end of the Alden Colliery at Elk Station, Pa. The operation was recently taken over by the Susquehanna Collieries Division of M. A. Hanna Co. Formerly operated by the Alden Coal Co., the operation was closed down June 10. Production was resumed July 11.

John W. Newett has been appointed chief engineer of Phelps Dodge Corp.'s New Cornelia Branch, Ajo, Ariz.

Warren O. Thompson has been appointed head of the University of Colorado's department of geology. He succeeds Dean P. G. Worcester who will devote his time to teaching and to his duties as dean of the graduate school. Before joining the faculty of Colorado University, Mr. Thompson taught at Washington University, St. Louis. Previously he had been a

geologist for the Midwest Refining Co.

John W. Barton has been elected president of Inland Coal & Dock Co., Minneapolis, Minn., succeeding Henry G. Schmidt, now chairman of the board.

Herbert Hoover, former president of the United States, celebrated his seventy-fifth birthday on August 10. Mr. Hoover worked for the U. S. Geological Survey and in the mines in California in the 1890's while he was still an undergraduate. He was an engineering graduate in the first four-year graduating class at Stanford University in 1895. For nearly 20 years following his graduation, he followed a career in mining in this country, Australia, Africa, Europe, and Asia.

Ezra Van Horn resigned as chairman of the negotiating committee for northern and western coal operators, and Frank R. Amos, vice-president of Pittsburgh Consolidation Coal Co., is temporarily taking his place.

Mack C. Lake, internationally known mining engineer and geologist, has been appointed consulting engineer exclusively for the Oliver Iron Mining Co. and other U. S. Steel Corp. subsidiaries. In his new capacity, Mr. Lake will deal largely with the company's ore developments in foreign fields. In 1915 he joined the M. A. Hanna Co. at Duluth, Minn. and since 1927 has also been active for other companies with responsibilities relating to manganese, copper, quicksilver, and other nonferrous metal mining operations and explorations. Mr. Lake assisted the Oliver Iron Mining Co. as a consulting geologist in charge of its Venezulean exploration program.

R. A. Ruff, recently resigned as general manager of Crozer Coal and Land Co., Elkhorn, W. Va., is now located in Bluefield, Va.

Donald McCloud Given, Jr., is now fuel engineer for the Fairmont Coal Bureau, New York, N. Y. Mr. Given was formerly a research engineer in the fuels division of Battelle Memorial Institute at Columbus, Ohio.

Robert Diefendorf has been elected assistant comptroller of the Oliver Iron Mining Co. Mr. Diefendorf was employed by the company in 1947 to supervise the installation of a modern cost accounting system. He came to the Oliver Co. from the H. C. Frick Coke Co., Pittsburgh, Pa.

John Childers has been promoted from inspector in the Consolidation Coal Co.'s (Ky.) safety department to mine foreman of Mine No. 214 at McRoberts, Ky.

Arthur W. Heuck has left for Cyprus to join the staff of the Cyprus Mines Corp., Skouriotissa, Nicosia, Cyprus. For several years he had been in charge of the Johnson Camp Unit of Coronado Copper and Zinc Co., near Dragoon, Ariz. That property was closed June 30 because of low zinc and copper prices.

James Kelly, manager, Sterling Coal Co., was elected president of the Louisville Coal Institute for the coming year. Other officers are Louis Lanning, Jellico Coal Co., first vice-president; Ed Borleis, Sr., Early Coal Co., second vice-president; J. W. Buchanan, treasurer; and Robert L. Coffin, remained secretary.

Daniel C. Jackling, "Father of the Porphyries," whose Utah Copper technique and operating procedures are known to engineers throughout the world, became 80 years old on August 14. A metallurgist-mining engineer, he has been an outstanding contributor to the mineral economy of the whole world and has shaped the careers of many engineering and mining men.



George H. Esser has been reelected president, secretary and treasurer of the Virginia Coal Operators Association, and H. W. Meador has been elected vice-president. E. H. Robinson will serve as assistant secretary-treasurer and E. P. Humphreys as national councilor to the United States Chamber of Commerce.

W. L. Anderson, who resigned from Emperius Mining Co., Creede, Colo., last fall, is now general superintendent for the Vanadium Corp. of America at Durango, Colo.



**Grover C. Pidgeon**, chief engineer for the mines division, Copper Queen Branch, Phelps Dodge Corp., retired from active duty on July 31, 1949. He has been succeeded by **H. H. Schou**, who has been serving as mine superintendent. Mr. Pidgeon went to Bisbee, Ariz., in 1908, to work for the Calumet and Arizona Mining Co. In 1911 he joined the staff of the Copper Queen and in 1923 was appointed chief engineer, a position he held until the merger of Phelps Dodge and Calumet and Arizona. In 1936 he was again named chief engineer and retained that position until his retirement.

**Frederick G. Michels**, formerly with the Mine Safety Appliances Co., has joined the staff of the North Range Mining Co. as director of safety.

**H. L. Hartman, Jr.**, has been named state mine dust engineer, assigned to the office of State Mine Inspector Clifford Murdock, Phoenix, Ariz. He succeeds **James E. Werner**, resigned.

**Hubert E. Howard** of Chicago, chairman of the board, Binkley Coal Co., and prominently identified with the coal industry for many years, has been appointed chairman of the Defense Policy Board effective September 1, to succeed **Thos. R. Reid** of Baltimore. Mr. Howard has been serving as negotiator for operators in Illinois and Indiana at the White Sulphur wage conference.



HUBERT E. HOWARD

**Robert P. Matson**, **Wilbert M. Smith** and **John A. Graves, Jr.**, are new members of the engineering staff in the M. A. Hanna Co.'s Iron River, Mich. offices.

**Wilbur A. Haley** is now with the U. S. Bureau of Mines in Pittsburgh, Pa., as a mining engineer in the fuels and explosives division.

**Earl F. Hastings**, metallurgical engineer of Phoenix, Ariz., has been appointed director of the new Securities Division, Arizona Corporation Commission.

**P. F. Masse**, **C. H. Sprague & Son Co.**, has been named national chairman of the 1949 convention of the National Coal Association. The convention is scheduled for the Waldorf-Astoria Hotel in New York, October 5-7.

**E. D. Wingfield**, general manager, Freeport Sulphur Co., has been elected a vice-president of the organization in charge of the company's southern operations. He will make his headquarters in New Orleans.

**Earl M. Richards**, now vice-president in charge of operations, will become vice-president in charge of planning and development for Republic Steel Corp. Mr. Richards succeeds **N. J. Clarke** who is retiring effective December 31.

**Joseph B. Burns**, formerly superintendent of the Harris mine, Colorado & Utah Coal Co., has been appointed manager of mines for the organization and also for the Red Wing mine, Colowyo Coal Co., Axial, Colo. **H. C. Marchant** has been named special representative and will assist the president on special assignments.

**Louis C. Ball**, formerly geologist for the Permanente Metals Corp., has been transferred to another Henry J. Kaiser Co. subsidiary, the Standard Gypsum Co. of California, with headquarters in the Kaiser Building, Oakland, Calif.

Ayrshire Collieries Corp. recently announced the appointment of **James W. Morgan** as vice-president and general manager, succeeding **J. B. F. Melville**, retired. Mr. Morgan has been in the coal industry since 1921. Mr. Melville, who has had 24 years of service with Ayrshire, will continue as a director of the Ayrshire group.

**Henry H. Bruhn**, former refinery superintendent, U.S. Potash Co., Carlsbad, N. M., is now general superintendent succeeding **Colwell A. Pierce** recently retired. **Russell H. Mills**, former refinery foreman is now superintendent.

**John J. Foster**, formerly assistant vice-president, has been named assistant to the president of Island Creek Coal Co. **R. Glen Lazzell** was appointed engineering and research assistant on operating and engineering problems.

**Clement Neumann** has been appointed safety inspector of iron mines of the North Range Mining Co. of Mich., succeeding **A. J. Guscatt**, who is now superintendent of the Blueberry iron mine on the Marquette range.

**R. H. Moore**, vice-president, Rich Hill Coal Mining Corp., has been named a member of the safety committee of the National Coal Association by **Charles A. Owen**, association president. Mr. Moore fills the vacancy left by the death of **Charles O'Neill**.

**Edward V. Hickey**, 59, director of production for the National Security Resources Board, died July 25 in Washington, D. C. Mr. Hickey came to the Resources Board from the Norfolk Paint Co. of Quincy, Mass., where he had been vice-president in charge of sales. During World War II he served as regional manager in New England for the Office of Production Management and several of its successor agencies.

**Thomas McCormack**, 77, died on August 17. Mr. McCormack was born in New Brunswick, Canada, and came to California as a young man to settle in Rio Vista. In 1914 he began his political career and was elected a state senator in 1928. He served in the Senate until the end of 1948, when he retired from public life. He had been president of Natomas Co. since 1929, and president of the Bank of Rio Vista.



Senator McCormack was widely known and was loved and respected by all who knew him.

**Venable Johnson**, for 35 years manager of the Detroit office of the Island Creek Coal Sales Co., died August 10 at Lake Worth, Fla. Mr. Johnson had retired in January of 1946.

**William H. Crago**, 69, prominent in the development of Lake Superior iron mines, died July 12. After graduation from the Michigan School of Mines, Mr. Crago was employed by Oliver Iron Mining Co. for about 10 years. He directed exploration for the Katanga Copper Co. in the Belgian Congo and did engineering work in China, Manchuria, Mexico, and Canada. Since 1940 he had been consulting engineer for the Steep Rock Iron Mines, Ltd.

**William Bowen Gohring**, 71, died at his home in Phoenix, Ariz., on July 13, 1949. Since 1936 he had been in charge of the mine loan division of the Reconstruction Finance Corporation for Arizona.

**E. M. Moores**, of Glendale, Ariz., died June 11, 1949, following a lengthy illness. He had taken an active part in mining operations in Arizona, particularly in the Crown King and Dripping Springs districts.





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These three important requisites for excavator service are outstandingly filled by the Bucyrus-Erie 85-B electric shovel. The 3¼-yard 85-B is trimly designed, built of specially selected steels and alloys to insure strength and long life in every part, yet with no excess weight anywhere to slow cycle time and waste power. Bucyrus-Erie's unequalled experience in the construction of excavating machinery provides the scientific balance of speeds, power and weight placement that means smooth, fast, efficient action. Responsive Ward-Leonard

variable voltage control gives the operator complete mastery of the machine for a rapid, output-boosting cycle. Machinery is easily accessible and maintenance requirements kept to a minimum, so upkeep time and costs are low. See one in action, and it's easy to understand why the "years ahead" 85-B is chosen for service in mines and quarries the world over.



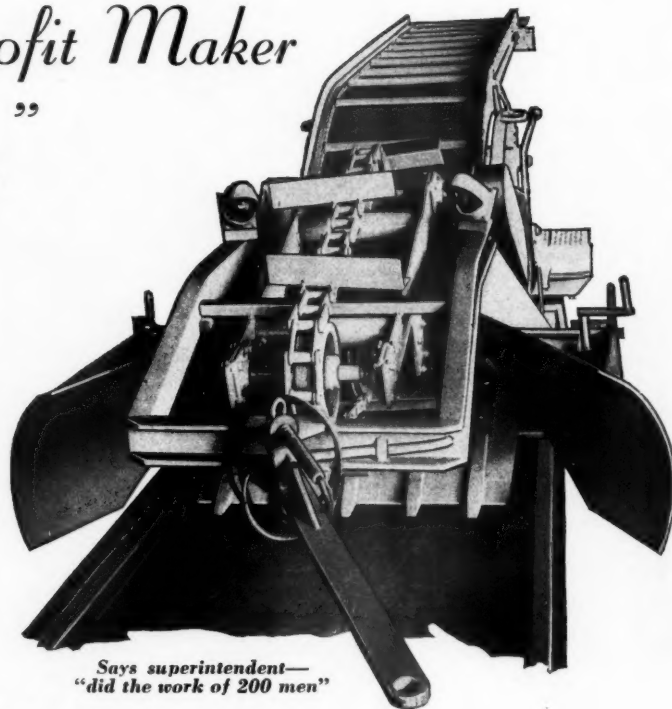
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*Says superintendent—  
"did the work of 200 men"*

### One Ton Dirt per Minute

The "Canton" Track Cleaner matches the outstanding and dependable performance of all well-known "Canton" American Mine Door Mining Equipment. Read brief specifications.

Rigidly built to meet the demands for a heavy duty machine, DIGGER PLATE can be raised or lowered with a hydraulic pump, WINGS are adjusted, up or down, in or out, independent of each other. FRONT CONVEYOR is of floating type, handling large rock. BOOM built to accommodate car size. BOOM CONVEYOR can be raised or lowered. MACHINERY protected with a shear pin, quickly changed. Standard WINGS clean 48 inches from center of track gauge. Extensions to WINGS permit cleaning wider space. Pulled by a locomotive. Length 21 ft. width to conform to haulway. Weight 6500 lbs. Capacity—one ton dirt per minute.

Manufacturers—Distributors, Automatic Switch Throws, Safety Signal Systems, Mechanical Car-transfers. Send for bulletins.

This machine is now making history in economical coal mining because a machine will now keep floors cleaned and safe, taking the place of track cleaning crews, who have always avoided this type of job.

#### PERFORMANCE RECORD

Operating time .....	100 hr.
Operating 3 men .....	300 hr.
Cost of labor .....	\$412.00
Distance cleaned .....	27,860 ft.
Cost per foot cleaned .....	\$ 0.015
Cost per ton loaded .....	\$ 0.465
Tons loaded .....	887

One mine cleaned 15 miles of track in 11 days.

Comments of Superintendent, six months after delivery of machine: "We have done more cleaning than we could ever have done by hand. 200 men would not have done as much as we have accomplished." (Name on request.)

*In writing, please use street and zone numbers*

## THE AMERICAN MINE DOOR CO.

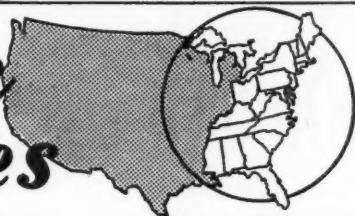
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# NEWS

## and VIEWS



### Eastern States



#### Bureau of Mines Reorganization

TO improve the efficiency of its operations and to increase its service to the public, the U. S. Bureau of Mines has undertaken an extensive reorganization. The new organization establishes eight operating regions. Region VIII comprises the northeastern states, bounded on the south by the southern boundaries of Virginia and Kentucky, and on the west and north by the Mississippi River and Great Lakes. Region VII comprises the southeastern states from the Mississippi River east. Region VI, the south central region, includes Kansas, Missouri, Oklahoma, Texas, and Louisiana. Region V, consists of the north central states of Nebraska, the Dakotas, Minnesota, Iowa, Wisconsin, and Michigan. Region IV, comprises the Rocky Mountain states of Wyoming, Colorado, Utah, New Mexico, and Arizona. Region III, California and Nevada, and Region II, Washington, Oregon, Idaho, and Montana. Region I is Alaska; the foreign minerals work is called Region IX.

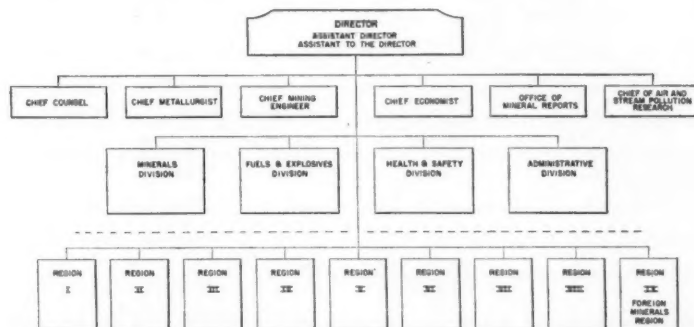
Each region will have a regional director, reporting directly to the Director of the Bureau, and responsible for all operations and administration of the Bureau in his jurisdiction. The regional directors will attempt to handle all problems of a local nature; they will be in contact with the State officials in their regions, and will represent the Bureau in dealings with other Bureaus of the Interior Department and with other Departments.

The Washington office has been reorganized along commodity lines. For this purpose, Health and Safety were considered as a commodity, and no significant change has been made in the Division, except for the transfer to it of the accident analysis branch. The present Fuels and Explosives

through commodity groupings such as ferrous metals, nonferrous metals, light metals, etc.

For research and planning functions that cut across the commodity divisions, advisory positions have been established consisting of a chief mining engineer (E. D. Gardner), a chief metallurgist (Oliver Ralston), and a chief economist. In addition reporting directly to the director, is the chief counsel, the chief information officer, and the chief of air and stream pollution research.

The initial state of reorganization goes into effect on September 1, but it will be several months before the final reorganization is in full operation. In the meantime, all administrative activities are being as rapidly decentralized as possible, so that each



Organization of the Bureau of Mines

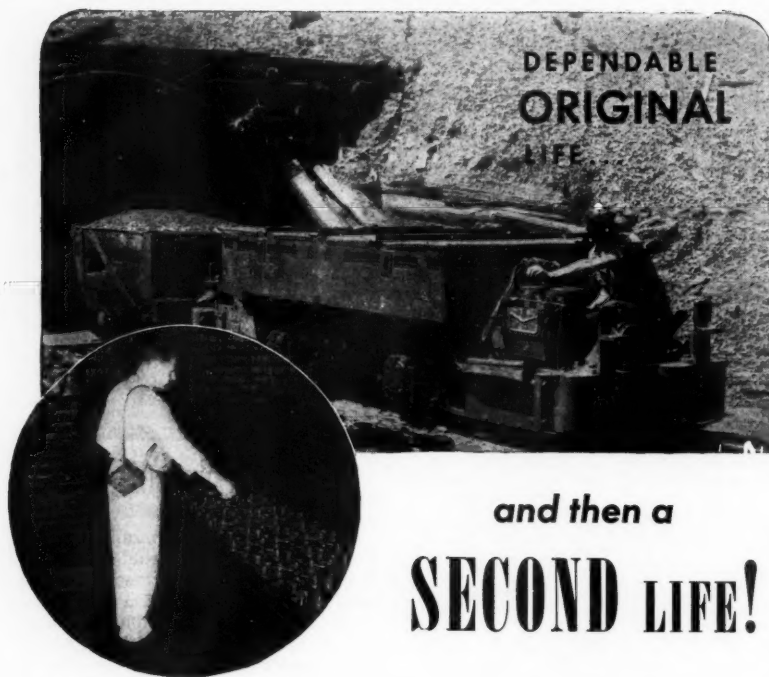
Division is augmented by the transfer from the former Economics and Statistics Division of the economic and statistical reporting on petroleum and coal. Thus, the chief of the Fuels and Explosives Division should be able in the future to measure more accurately the interrelationship between the various energy producing industries.

A new Minerals Division has been established which combines the functions of the Mining and Metallurgical Divisions and the remainder of the Economic and statistics Division. This division will operate primarily

region with a minimum delay can make disbursements, write its own contracts, do its own hiring and changing of personnel, and similar tasks.

It is hoped by this reorganization, that the Bureau's work will be better coordinated and that its objectives and functions will be more effectively accomplished. The regional plan should enable the Bureau to be more responsive to local needs and to improve its work. The Bureau should be in a better position to acquire, interpret, and provide, to the policy making agencies of the Government,





## and then a **SECOND LIFE!**

**M**ANY MINING ENGINEERS know that steel-built EDISON Nickel-Iron-Alkaline Storage Batteries are exceptionally dependable for rigorous mine haulage duty . . . but others have found they also have a *second* life!

The battery shown above is made up entirely of cells "retired" from locomotives of the Hudson Coal Company, Scranton, Pa. These cells range in age from 17 to 27 years and have served a full life in haulage duty, yet today they deliver 80 per cent of rated capacity. As a standby battery, they operate a bank of circuit breakers and carry emergency lamp loads of over 2800 watts. In effect this protection is free, thanks to EDISON second life.

An example of economy? Yes—and an indication of the unmatched dependability of EDISON Batteries on the original job. *They're built stronger—last longer!*

**ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES:**  
They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.



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**STORAGE BATTERIES**



**EDISON STORAGE BATTERY DIVISION**  
of Thomas A. Edison, Incorporated, West Orange, N. J.  
In Canada: International Equipment Co., Ltd., Montreal and Toronto

the essential information that is needed for consideration in the development of domestic and foreign policies in which the mineral industries of the United States are concerned.

### **Anthracite First Aid Team**

On August 6 in Mahanoy City, Pa., 11 first aid teams representing anthracite operators competed for cash prizes. Thirty-eight anthracite companies comprising the middle and southern individual operators first aid meet association sponsored the meet, in cooperation with UMWA, the Pennsylvania Department of Mines, and the U. S. Bureau of Mines.

### **Joint Meeting on Coal**

On October 26-27 the Twelfth Joint Meeting of the Coal Division of AIME and Fuels Division of ASME will be held at French Lick Springs Hotel in southern Indiana. Technical sessions on the program will cover dewatering and drying coal, froth flotation, and laboratory control practices.

A field trip will be made to the Maid Marian Mine of the Central Indiana Coal Co., where visitors will have the opportunity to see the latest earth moving equipment in operation and be able to inspect the modern preparation plant.

### **Water Threatens Mine**

The M. & S. mine near Minersville, Pa., with a potential monthly output of 50,000 tons, is threatened with flooding from nearby abandoned mines. The mine may be permanently shut down unless pumping equipment can be installed. Reserves are said to total some 15,000,000 tons of marketable coal.

### **New Slope Mine**

The Franklin Coal Corp. is sinking a new slope mine south of Royalton, Ill., where its No. 7 mine is located. The Taylor No. 5 mine near Freeman, Ill., was recently reopened after a ten-week shutdown. The mine will now work both night and day shifts with a crew of about 200 men. A lull in sales closed the mine in April. Under present market conditions, it is estimated that the Taylor No. 5 will be able to operate from 18 months to two years.

### **New Plant Plans**

A report from the U. S. Securities and Exchange Commission estimates that the mining industry will spend \$190,000,000 on new plants and equipment in the third quarter of 1949. Mining companies spent an estimated \$200,000,000 in the second quarter of this year, according to the report. Expenditures of the industry in 1948 totalled \$800,000,000.



## Fire Destroys Tipple

The tipple of the Ten X Coal Co., near Cannelville, Ohio, was destroyed by fire early in August. The damage was estimated at \$60,000. The mine, reported to be one of the most highly mechanized in the area, has been operating three days a week during the current contract negotiations.

At about the same time, the tipple of the William Hughes coal mine, near Roseville, Ohio, was damaged by fire.

## Magnesite Plant Closes

Operations at the Northwest Magnesite Co.'s plant at Cape May, N. J., have been suspended pending a revival in steel activity. A plant expansion program has also been deferred. The plant has a six-month supply of magnesite on hand at the current rate of consumption.

## Mining Graduates

Twenty-nine coal miners received diplomas from the mining school of St. Francis College, Loretta, Pa., upon completion of a three-year course of summertime study. The unique school, offering a concentrated course in mining during summer months, was established in 1947 by a \$50,000 gift from the Central Pennsylvania Coal Miners Association.

## Pioneer Mine Sold

Recently, Albert B. Hill, president, Pioneer Coal Co., Louisville, Ky., announced the sale of a mine at Kettle Island to O. H. Viall. The property consists of 700 acres of land, 175 miners' homes, coal tipple, and other facilities.

Operating as the Adventure Coal Co., Mr. Viall plans to resume operations of the Pioneer mine. The Pioneer property and tipple will be utilized and development is planned on 8000 additional acres of coal land.

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## Steel Conveyor Belt

Stainless steel conveyor belt tests were successfully conducted at the Johnstown Coal & Coke Co.'s Crichton No. 4 Mine in Nicholas County, W. Va., the latter part of July. Conventional rubber belt equipment was used with only slight modifications. The belt was run for several hours under several degrees of loading conditions.

The initial test of the new type conveyor belt was under the supervision of Forbes R. Clarke, Jr., project engineer for the mining development committee, Bituminous Coal Research, Inc. Further testing and development to make possible even a limited use of the new belts will require another six months, according to Gerald von Stroh, director of the mining development program.

## Anthracite Safety Meet

With a score of 99.58, the Repplier Coal Co. team won first prize for the second successive year at the Annual Safety Day and First Aid Meet at Lakewood Park, Pa., August 6. The fifth annual event, sponsored by the 38 anthracite companies of the Middle and Southern Individual Anthracite Operators First Aid Meet Association, paid cash prizes of \$525 to five winning teams. First prize of \$150 went

to the Repplier team with second to fifth awards going to St. Clair Coal Co., Phoenix Coal Co., Locust Coal Co., and Buck Run Coal Co. Boy Scout Troop 44 from Ashland, Pa., took top honors in a special event.

## Coal Plant Nears Completion

The Westmoreland Coal Co. plans to complete development work at its new mining property in Logan County, W. Va., in September. Coal production is scheduled to begin in November. The mine will produce about 600,000 tons a year which will more than offset decreasing tonnage from some of the company's Pennsylvania mines. The mine is reported to have a reserve of approximately 125,000,000 tons of coal.

## Coal Land Leased

Jewell Ridge Coal Corp. has leased 1800 acres of coal land in West Virginia from the Olga Steel Co. The land contains the Jewell seam and lies adjacent to the Jewell Ridge property. The additional acreage is expected to extend the life of the company's operations for approximately 20 years and raise production from 5000 tons daily to 6000 tons per day. When full development is reached, it is planned to add 200 men to the mine force.

## Oriole Mine Opened

Bell & Zoller Coal and Mining Co. opened its new Oriole mine near Madisonville, Ky., late in August. The 500tph capacity colliery incorporates the most modern coal-cleaning equipment.

H. F. McDonald, president of the company, stated that within six months the company will open its new Moss Hill mine, close to the Oriole. The new operation will be similar in design as the Oriole and will have a capacity of 3000 tons of coal per day.

## Accident Rate Drops

During the first six months of 1949, fatal accidents in coal mines declined 32 percent as compared with the first half of 1948. Accidents were 48 percent below the total during a similar period in 1947.

The U. S. Bureau of Mines records, based on coal tonnage, show a tentative fatality rate for the first half of 1949 at a record low of 1.21 deaths per 1,000,000 tons of coal, compared with a rate of 1.55 in the first half of 1948 and 1.84 in the first half of 1947.

No major disaster has occurred during the first half of 1949 and statistics show that 333 miners were fatally injured in the six-month period.

# Parmanco

HI-SPEED HORIZONTAL  
— DRILLS —

*New Traction Drive with Forward and Reverse*



**PARIS MANUFACTURING COMPANY**

Are  
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**6-INCH SHOT-HOLES  
READY FOR LOADING**

**AT BETTER THAN  
A FOOT A MINUTE!**

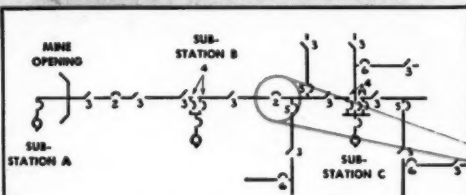
The new Parmanco Hi-Speed Horizontal Drill is completely redesigned around a 40-H.P. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time—a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition, the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

**For BOTH MINES and CONSTRUCTION**

**PARIS, ILLINOIS**

## To BOOST PRODUCTION—INCREASE SAFETY— apply these recommended sectionalizing practices

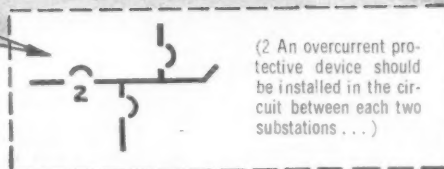
When electrical distribution systems are properly sectionalized with I-T-E Sectionalizing Switchgear, production levels are raised: time lost because of electrical disturbances is kept to a minimum; safety to personnel and equipment is assured. Study these recommendations—see how they would apply to your distribution system—find out how your mine can benefit from proper applications of I-T-E Sectionalizing Switchgear!



### THE RECOMMENDED D-C SECTIONALIZING PRACTICES:

#### Key

- 1 In each of the following cases, sufficient feeder and return circuit capacity should be provided so that the overcurrent protective device will be opened by a deadshort-circuit at the most remote point of the circuit.
- 2 An overcurrent protective device should be installed between each two substations at such a point in the circuit that the resistance between each station and the device is approximately the same.
- 3 A disconnect switch or protective device should be placed at not more than 1,500 ft. intervals in every power line.
- 4 An overcurrent protective device should be used in each circuit leaving a substation. If automatic reclosing circuit breakers are employed for this, trip-free operating mechanism should be used.
- 5 An overcurrent protective device should be placed at each main-branch circuit.
- 6 Each mining setup should be protected by an overcurrent protective device. In some cases, it may be necessary to protect two setups by one device.



(2 An overcurrent protective device should be installed in the circuit between each two substations...)

The most important application, from a fire prevention standpoint, is preventing distant sub-stations from feeding into a short anywhere in the lines between the substations. By installing an I-T-E Type KSC Automatic Reclosing Circuit Breaker for this duty, substations are quickly—effectively—separated in event of a fault.

The KSC operates on circuits which can be fed in either direction; protects feeders and equipment by detecting disturbances on either side; opens quickly at first sign of short or overload—recloses automatically on a return to normal line conditions. For complete information on the I-T-E Type KSC—the only circuit breaker developed specifically for the mining industry—write for Bulletin 4611.

To find out how you can benefit from a proper application of I-T-E Sectionalizing Switchgear in your mine, consult the I-T-E Mining Specialist in your locality. He understands thoroughly the Bureau of Mines' new recommendations of Standard Safety Rules for installing and using electrical equipment in coal mines. He is also fully qualified to assist you in laying out the sectionalization of your distribution system. Use his services without obligation.

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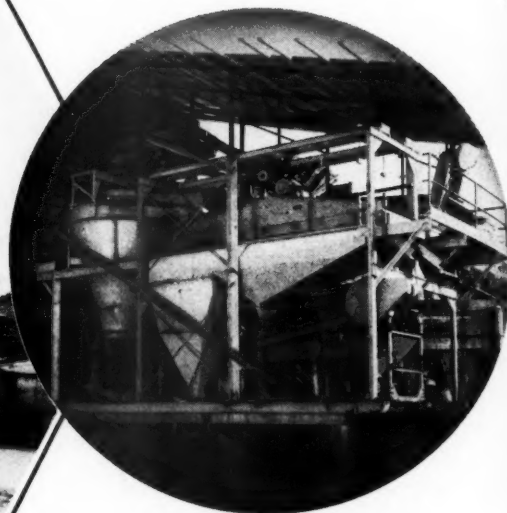
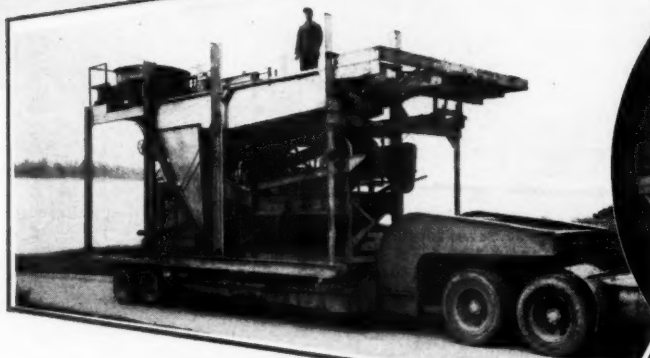
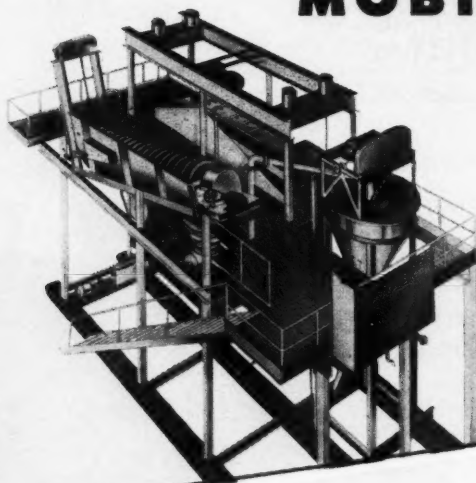
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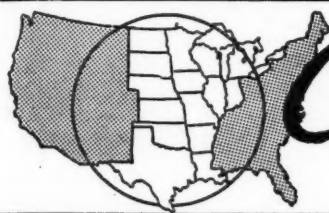
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# Central States

## Mine Disaster Averted

ALL 257 men in the No. 59 mine of the Peabody Coal Co., near Springfield, Ill., escaped when it caught fire just before noon on August 15. None of the miners were injured.

A preliminary report from the U. S. Bureau of Mines described how the men in the mine were notified of the fire by telephone and directed to seek safety immediately after it broke out. Sixty-two of the men escaped to the surface through the main hoisting shaft, but the remaining 195 men were barred from the regular mine openings by deadly fumes. Of these, 135 who were working in the most remote sections of the mine proceeded to an intake air and escapeway shaft that had been completed recently, and were hoisted to safety three at a time. The remaining 60 men, trapped at the entrance of their section by smoke and fumes that prevented them from reaching an escape shaft 150 ft away, were found by a rescue party consisting of company officials. They were in no immediate danger, and were advised to stay where they were until changes could be made in the ventilation.

After these changes had been made and the condition of the air improved, an Illinois state mine rescue team, provided the trapped men with respiratory protective devices and escorted them to safety.

The fire started when a trip of loaded cars collided with four empty cars that had broken loose from another trip. The force of the collision threw the empty cars against a live trolley wire. An electric arc resulted, that set fire to the wooden part of the cars, which in turn ignited surrounding timbers and coal. Fire-fighting began immediately after the outbreak of the fire.

Observing that some of the worst disasters in the history of American coal mining have been caused by fires, Dr. James Boyd, director, U. S. Bureau of Mines, remarked that if the management had not provided sufficient escapeways, if the men had lost their heads and become panicky, or if gas masks and other respiratory aids had not been available, the fire at the No. 59 mine might easily have been added to the list of mine disasters.

"As it is," he stated, "it is an illustration of what can be accomplished

when mine operators, mine workers, State mining agencies and the United States Bureau of Mines cooperate to increase coal-mine safety and save miners' lives. Everybody concerned knew what to do and did it. The incident shows how being prepared for an emergency pays off."

## New Open-Pit Mine

One of the largest and most modern coal mines in the State of Iowa will be the new Pershing mine of the Sinclair Coal Co., Kansas City, Mo. Estimated production from the mine will exceed 20,000 tons per month. Four sizes of coal will be produced in a modern preparation plant. Extensive reserves are reported to exist in the 12-sq mile tract which has been acquired for the new mine. Mining equipment includes a dragline with a 175-ft boom, a 10-cu yd shovel, and numerous pieces of other heavy equipment.

## Safety Meet in Chicago

The 37th National Safety Congress, annual convention of the National Safety Council, to be held in Chicago October 24-28, will feature talks on dust control in anthracite regions, health and safety practices, company reports on training programs, the problems involved in reopening an old mine, and a discussion of the mining association's contribution to accident prevention. J. K. Richardson, Utah Mining Association, Salt Lake City, Utah, general chairman of the mining section, will preside at all the sessions, which will be held at the Stevens Hotel in Chicago.

## Tri-State Strike Ends

A five-week shutdown of the Tri-State mining fields ended early in August when the Eagle-Picher Mining and Smelting Co. resumed operations under a new work contract.

The new contract, to run until April 30, 1951, includes a daily wage cut of \$3.08. However, the contract also provides for a sliding wage scale based upon the price of zinc. Under this agreement, wages will remain at the \$3.08 level until the price of zinc, East St. Louis market, reaches 10.50¢. Thereafter each one cent increase in

the price of the metal will be met with an increase of 6.43¢ an hour in wages.

Resumption of mining by Eagle-Picher points the way to renewed production by the independent mine operators who ship their ore for processing to the Eagle-Picher's central mill, near Cardin, Okla.

Suspension of mining operations last June 30 was caused by the drastic drop in the price of zinc and lead metal and excessive inventories, according to Elmer Isern, president of Eagle-Picher.

## Lake Ore Movement

Iron ore shipments from Upper Lake ports totaled 2,677,118 gross tons for the week ending Monday, August 15. These figures compare with 2,873,371 tons in the same period of 1948, a decline of nearly 200,000 gross tons. Ore movement for the entire season up to August 15 totaled 51,258,380 gross tons as compared with 48,309,432 tons in the same period of 1948, an increase of 2,948,948 tons.

## Inclined Hoist at South Agnew

At the South Agnew plant on the Mesabi range, Minn., an inclined hoist is used to remove ore from the narrow, deep ore body. The installation



permits mining of the ore without leaving benches for tracks or belts.

Two skips operate in balance on the 38-deg inclined skipway. Each skip has a 25-ton ore capacity. Initial hoisting distance is 355 ft and will eventually be 830 ft as mining progresses. Loads are dumped directly from the skip into the screening plant by an ingenious arrangement which

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dumps the skip box mounted on the skip car. Both rock as well as ore is handled by the hoisting and screening plant thus eliminating the long haul up the steep grade out of the pit.

## **Radioactive Cores Sought**

Diamond drill cores and churn drill cutting samples that have been stored for years at the Rolla, Mo., branch of the mining division of the Bureau of Mines are getting a once-over again these days. The staff of the Rolla branch is checking the core drill and cutting samples in the search being conducted for fissionable materials and atomic energy developments. The samples originated in Missouri, Arkansas, Indiana, Illinois, Kansas, and Oklahoma and number in the thousands.

Leon W. Dupuy, chief of the branch, said that a few of the samples studied with the Geiger-Mueller counter are radioactive. They may be of considerable future value, although they do not represent a deposit of present commercial interest, he said. The samples are housed in a new, \$12,000 fireproof core library building.

## **C & H Reopens Mines**

Early in September the Calumet & Hecla Consolidated Copper Co. reopened its mines in the upper peninsula of Michigan that had been shut down for four months. The mines were closed last spring when the copper price dropped.

Before closing down last May 2, copper production at the Calumet & Hecla properties averaged about 1500 tons per month.

## **Indiana Maps Available**

Aeromagnetic maps for 27 Indiana counties are now on open file according to W. E. Wrather, director of the U. S. Geological Survey. The maps (scaled to 1 in. equals 1 mile) show preliminary uncorrected isomagnetic contours derived from total-intensity aeromagnetic surveys made at 1000 ft above the ground in 1947 and 1948. These rough, worksheet maps will be replaced by final county aeromagnetic maps.

## **Zinc-Lead Reserves Estimated**

Reserves of zinc-lead ore in the Tri-State District were estimated at 66,100,000 tons of minable ore in the latest survey report released by the U. S. Bureau of Mines. This is 15,000,000 more tons than estimated by early figures in 1946.

Missouri is credited with 27,156,000 tons of the estimated reserves, Kansas with 25,226,000 tons, and Oklahoma with 13,718,000 tons. The District it-

self is credited with 17 percent of the zinc and six percent of the lead produced in this country in 1947. In 1948 zinc production dropped to the lowest on record since 1896 due in part to high production costs. Over half of the reserves in Missouri and Kansas are under water, representing a major cost problem for the area.

The survey of 38,900 acres in the District was conducted from October 1945 through December 1947 by the mining division of the Bureau.

### Tri-State Zinc Active

In the Illinois-Wisconsin zinc district, the only active mine on the Illinois side is the Tri-State Zinc Co., which operates a few miles south of Galena, Ill. Recently the Eagle-Picher Co. closed down its mine near Galena.

### Iron Ore Consumption Declines

Between March through July of this year, the monthly consumption of Lake Superior iron ore declined from its highest peacetime consumption to the lowest July consumption since 1939. Indicative of the downward trend of steel production, the use of iron ore has fallen below the 5,493,961 tons used in July 1940, when the steel industry was at the point of rising production.

In July 1949, consumption of Lake Superior iron ore dropped to 5,258,321 tons, approximately 1,000,000 gross tons less than were consumed in June and about 1,250,000 tons less than were consumed in July 1948.

For the year 1949, through July, consumption amounted to 48,423,087 gross tons. This figure compares with 44,820,566 tons consumed in the corresponding period of 1948.

Stocks of iron ore on hand in furnaces and on Lake Erie docks were 35,063,647 tons on August 1, 1949. Furnaces in blast on that date totaled only 142 out of a total of 195 available. Last year on August 1 there were 179 active furnaces out of 194 available.

### Vinegar Hill Resumes Mining

The Vinegar Hill Zinc Co., Platteville, Wis., which has not mined zinc ore in recent years, plans to reenter active production. A shaft is being sunk and a mine plant is being installed on the Blackstone property south of Shullsburg, Wis.

In recent years the sole activity of the Vinegar Hill company, oldest company in the Wisconsin zinc industry, has been the operation of a flotation mill at Cuba City, Wis. Due to the lack of ore from nearby mines, this mill was recently closed. Mines in the district have been closing down due to the high costs and the recent low prevailing price of zinc.

# Harder Ball

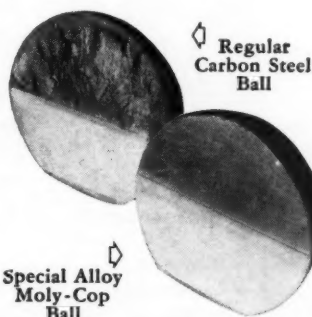
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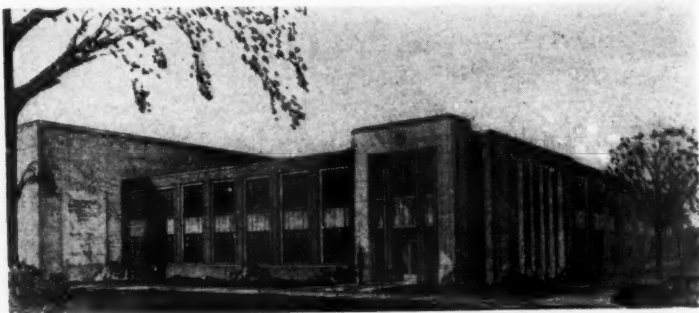


## Dakota Lignite Laboratory

Ground-breaking ceremonies for the new U. S. Bureau of Mines lignite research laboratory at Grand Forks, N. D., on the campus of the University of North Dakota took place on July 22. Contracts were awarded early this month and construction is to get

posed to air, its present use is restricted largely to the Dakotas and adjacent areas.

The research center will include a two-story laboratory for small-scale research, offices, and a general service section for supplies, and a three-



under way at once. The building is to be ready for occupancy in about a year, according to Dr. Ralph L. Brown, chief of the Bureau's Coal Branch.

The new laboratory, in the heart of the country's lignite deposits, will be the only one in the nation devoted exclusively to research on this high-moisture type of coal. Because of lignite's tendency to crumble when ex-

posed to air, its present use is restricted largely to the Dakotas and adjacent areas.

posed to air, its present use is restricted largely to the Dakotas and adjacent areas. To help expand the geographic distribution of lignite—a fuel representing nearly a fifth of the country's coal reserves—the laboratory will concentrate upon improved methods of drying to permit wider distribution and use. It will also engage in research work with the object of developing

equipment for more efficient burning of lignitic fuels and more efficient coal-gasification methods. One phase of the project includes gasification of lignite to provide high-hydrogen gas for reducing low-grade Minnesota iron ores. Of the estimated 939,000,000 tons of lignite reserves in the United States, about 98 per cent are located in North Dakota, Eastern Montana and south Dakota.

## Ajax Mine Washes Ore

Stripping of waste began in 1948 on the Ajax mine located on the eastern Mesabi iron range just east of Biwabik, Minn. Early this year the open pit had been stripped down to the ore body and was ready for production.

Skubic Brothers, operators of the property, set the property up for shovel-truck operation using trucks to haul ore to the Ajax plant. To remove objectionable material from the ore before shipment, a vibrating screen is used in conjunction with an Akins spiral classifier. A crusher, located under the truck dumping ramp, reduces the size of the coarse material.

Until the present operation, the Ajax mine, formerly an underground operation, has been idle for many years.

## Oliver Mines Wins Safety Award

Two Mesabi range iron mines of the Oliver Iron Mining Co. were honored by receiving Sentinels of Safety trophies for 1948 in the National Safety Competition sponsored and conducted by the U. S. Bureau of Mines. In the open-pit mines division of the competition, the Spruce mine, at Eveleth, Minn., won the trophy for working 588,221 man-hours without a lost-time injury. There were 70 open-pit mines in the 1948 competition and they worked a total of 20,000,000 man-hours with a frequency rate of 12.69 and a severity rate of 2.76.

J. E. Machamer, vice-president in charge of operations for Oliver, and J. M. Johnson, superintendent of the Spruce mine, received the award on behalf of the operation.

For the underground metal mines division of the competition, the Fraser underground mine, Fraser City, Minn., won the award for working 109,412 man-hours during 1948 without a lost-time accident and for working for 21 months without an accident of any kind. There were 41 underground mines in the 1948 competition and they worked a total of over 17,000,000 man-hours with a frequency rate of 27.75 and a severity rate of 6.20. A. C. Solem, mine superintendent of the Fraser mine, accepted the award on behalf of the operation.

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# Western States

## Lucky Friday Development

At the Lucky Friday mine, in the Coeur d'Alene district of Idaho, a blind vein 18 ft wide has been opened on the 1600-ft level. The vein was encountered about 90 ft from the shaft as crews were driving towards main vein which is expected to be approximately 220 ft from the shaft. A crosscut towards the principal vein will be driven before exploration of the blind structure is undertaken.

Arrangements are being made with the Hunter Creek property to continue the shaft down to the 2000-ft level on a cooperative basis which will give both properties an opportunity to extend exploration.

## Colorado Strip Mines

In a recent announcement the Pittsburgh & Midway Coal Mining Co., revealed that its subsidiary, the Osage Coal Co., will operate a strip coal mine near Milner in Routt County, Colo. This company has been operating strip mines near Ottawa, Ill.

An office is being opened in Denver with W. G. Joyce in charge as western manager. The company is also opening an office in Raton, N. M., with John F. Ferguson in charge as assistant western manager.

## Washington Coal Exploration

As a part of its study of the coal resources of the United States, the U. S. Geological Survey has contracted for a minimum of 3000 ft of core drilling in the Centralia-Chehalis field, Lewis and Thurston Counties, Wash.

This field, which lies a short distance from Puget Sound, contains in local exposures, coal beds ranging from 4-36 ft thick. As a preliminary attempt in providing a better understanding of the geology of the field, a geologic map was prepared during the summer of 1948.

The object of the drilling program is to determine the position and extent of the coal beds in areas where the coal-bearing rocks are obscured. When integrated with the geologic information obtained by careful study of all surface exposures of coal-bearing rocks, mines, and prospect pits,

the information obtained by drilling will aid in determining the structure of the coal beds, and the thickness and nature of the overlying rock. Accumulated geological information is aimed at providing information that will outline areas favorable for future strip and underground coal mining.

## Uranium Search Planned

An examination of the Hillside mine, Hillside, Ariz., is to be made by the Atomic Energy Commission to determine the possibilities of commercial uranium production from that property. Dr. George Bain, from Amherst University, has been assigned to the task. The Hillside property has been an intermittent producer of gold, silver, lead, and zinc since its discovery in 1888. Currently the Hillside is owned by J. C. Lincoln and Ernest

Dickie, manager of the Bagdad and Hillside mines. It is equipped with a 100-ton flotation mill and is on a regular production basis, employing a crew of about 50 men. According to Charles H. Dunning, director of the Arizona Department of Mineral Resources, the uranium content of the Hillside ore appears to run between 0.5 and 1 percent on the basis of Geiger counter tests. Samples tested by the department have come from the 300 and 400-ft levels of the mine, where the uranium is associated with pegmatite in a schist formation.

## Ray Reduces Output

During July the Ray Mines Division of Kennecott Copper Corp., Ray, Ariz., cut its copper production from 135,000 tons monthly to approximately 110,000 tons. The mine is now working on a three-shift, 40-hour week basis.

## Uranium Ore in Washington

It was recently confirmed by the Atomic Energy Commission that ore found in eastern Washington contains uranium, a state geologist, Grant M. Valentine, recently announced in Spokane. So far, the quality of the ore is too low for commercial use.

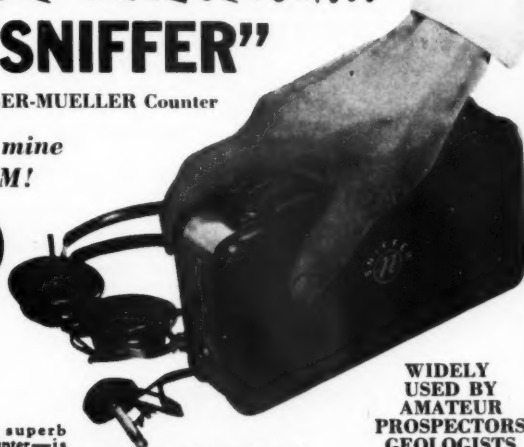
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## Yuba Consolidated Expansion

Yuba Consolidated Goldfields, California's leading gold producer, is now operating ten powerful dredges and is steadily expanding its operations. During the fiscal year ending February 28, 1949, the company dredged 344 acres, recovering 96,571 oz of fine gold and reported net earnings of \$317,377. High cost of operations cut deeply into profits with the labor scale now 55 percent above the 1941 level. Seven dredges are operated in the Yuba River field near Marysville, two

along Butte Creek in Butte County, and one in the Callahan area of Siskiyou County. The company also holds a 50 percent interest in the Round Mountain Gold Dredging Co., which expects to start large scale operations in October on gold placers at Round Mountain, Nev.

Yuba has approximately 5100 acres considered suitable for dredging and is preparing to dredge 5000 acres in the Yuba River field to a depth of 124 ft. This project includes cutting a channel averaging 600 ft in width for the Yuba River, with the stream

to be diverted from its bed for about a half a mile. Reddredging operations are expected to continue more than 20 years, with diversion of the river facilitating mining of large amounts of virgin gravel.

## Coal Plant Planned

The city of Provo, Utah, is being considered as a possible site for a commercial coal processing plant, planned by the Western Chemical and Refining Co., Salt Lake City, because of its proximity and rail accessibility to Carbon County, Utah, coal fields. The processing plant will be designed to extract oil and other products from coal by a process developed by K. L. Storrs, formerly of Provo. Keeping operation costs low enough to be commercially sound is the problem now facing promoters of the process. In cooperation with Coal Logs Co., Inc., the Western company has conducted a series of pilot plant experiments on Utah coals and plans are being made to use patents covering the new process.

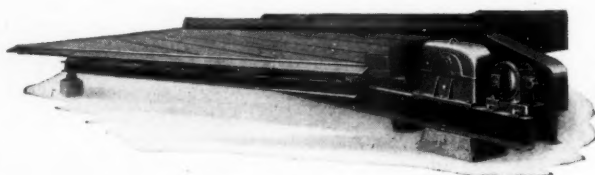
## Fire Damages Logan Mine

Fire leveled service buildings of the A. B. Logan gold mine near Cripple Creek, Colo., in July, causing damage estimated at \$100,000, according to W. Scott Stratton, owner of the famous old mine on Bull hill. The hoist, compressor and other machinery was ruined by the blaze.

## Day Mines Acquires New Properties

Day Mines, Inc., one of the "big five" operators of the Coeur d'Alene district in Idaho and holder of the greatest potential acreage of any of them, has acquired the old Richmond and Monitor mines, above Adair, Idaho, both of which were small copper producers 25 years ago. Richmond was the foundation of Richmond-Yukon, and Monitor Copper, which paid some dividends, was reorganized into Montana-Idaho Copper, finally becoming Montana Mines Corp., a gold producer in the Helena, Mont., district. Day Mines has also located most of the vacant ground between the Monitor and the old Idaho Star, now called the Hansey.

In a report to the stockholders, S. F. Heitfeld, secretary-treasurer, described two deeper exploration projects for the Hercules vein in the original Day property above Burke, Idaho. A station being cut on the 1200-level will permit diamond-drilling of the Hercules vein 500 and 1000 ft below the station. This will be started on completion of diamond-drilling the Castle Rock vein, also 500 ft below the lowest level. A 1400-ft crosscut from the Sherman 1500 level to the Mountain View and Hummingbird veins is now advanced 850 ft.



## The Swing to SuperDuty Continues

Modern demands for more efficient concentration of ores have led to increasing acceptance of the SuperDuty Diagonal-Deck Table, the most modern of concentrating tables.

New installations at mines of all sizes include SuperDuties singly and in huge batteries.

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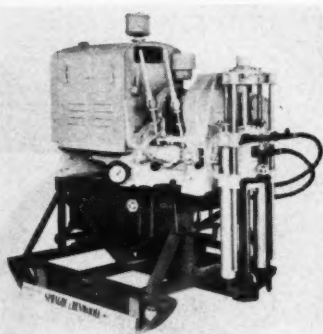
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## Round Mountain Gold

Near Tonopah, Nev., installation of equipment is proceeding rapidly at the gold placers of Round Mountain Gold Dredging Co. About 90 men are employed. A 14-mile, 5500-v power line to the property is being built and an adequate water supply is understood to have been developed by drilling seven wells in the nearby Smoky Valley. Placer mining will be conducted with power shovels, gravel will be delivered by conveyors to a large washing plant. The plant is expected to be in production this fall. The property is said to contain a huge deposit of profitable material persisting to a depth too great for dredging. Substantial interests are held in Round Mountain Dredging by affiliates of Gold Fields of South Africa and Yuba Consolidated Gold Fields, California's leading gold producer.

## Swansea Mill Burns

The flotation mill of the Swansea Mining Co., southwest of Lincoln, Mont., burned to the ground August 8. The mill, located at the old Silver Bell mine, handled 75 tons daily of gold and silver ore and was believed worth \$100,000.

## Castle Dome Stripping Halted

On August 5, the Castle Dome Copper Co., Miami, Ariz., reduced its working force by 47 men. The layoffs, according to R. W. Hughes, general manager, were not due to any further curtailment of copper production, but resulted from the completion of the stripping schedule at the Castle Dome open-pit operation.

## Overman Mine Continues Operations

Consolidated Chollar, Gould & Savage Mining Co., Gold Hill, Nev., continues milling 600 tons daily of ore at its Overman mine and is reported to be recording the most satisfactory year since 1941. Ore is mined with power shovels in open pits and values are recovered by cyaniding.

## Monazite Research

The University of Idaho school of mines is conducting a special research program on the rare earths recovered as by-products in the milling treatment of monazite sand from Idaho placer gravel deposits. Analysis research conducted by L. A. Jobe, professor of chemical engineering, indicates there are 15 individual rare earths in the monazite sand.

"The goal of this research project," says Professor Jobe, "is a process for the chemical separation of the rare earth metals in monazite. This would be of great assistance in the establishment of a home industry to handle

Idaho's vast quantities of monazite sand."

Rare Earths, Inc., is now treating Idaho placer gravels for the monazite sand content in a plant at McCall, Idaho.

## Coal Drying

Installation is under way by the Northwestern Improvement Co., of a new type of device for drying minus ¼-in. coal at its central washing unit at Rockland, Wash. The new unit will enable the company, largest producer in the upper Kittitas County field, to supply high grade, small size coal with a moisture content of about 4 percent. The machine will handle about 50 tons per hour.

## Colorado Fluorspar Boom

Colorado is now the third ranking state in the production of fluorspar, being headed only by Illinois and Kentucky. The fluorspar mining boom is largely the result of operations by two companies in the vicinity of Jamestown, Colo.; the General Chemical Co., a division of Allied Chemical & Dye Corp., and the H. M. Williamson & Son Mining Co. In 1940 the fluorspar industry in Colorado got its big start when General Chemical leased five abandoned gold mines. Today the Burlington, at that time no more than a prospect hole, is down 550 ft, with ore bodies developed in drifts and stopes at 100-ft levels. Of the five mines originally leased, only the Burlington is being operated, its ore having proven so good that the others were not bothered with, according to G. H. Musson, superintendent of Jamestown and Boulder operations for General Chemical.

The mine operates one shift, five days a week and employs about 25 men. In charge of mining operations is W. A. Popst, of Boulder. The company operates a large flotation mill at Valmont, a few miles east of Boulder on a three-shifts-around-the-clock basis for five days. About the same number of men are employed at the mill as at the mine. About 100 tons a day are handled by the mill. The final concentrate is shipped to chemical plants in Louisiana and Pennsylvania. The mill was put into operation in 1942 after development of the mine during 1941.

The Williamson company operates three mines, the Emmett, at 760 ft, the deepest fluorspar mine in the west, and the Argo, 350 ft deep, both along James Creek, as well as the 300-ft deep Blue Jay, southeast of town. Harry B. Williamson, associated with his father in the mining company, reports good ore showing at the bottom levels of all three mines. The Blue Jay operates on two shifts and the others on one shift. Crews are also working out the 100-ft level in



the Argo and the 150-ft level in the Blue Jay. Vernon Cobb is foreman at the Argo and Emmett, and B. D. Lott at the Blue Jay. The ore from all three mines is treated at the old Wano gold mill which the Williamsons refurbished in 1940 and sold to the Mahoning Mining Co. of Rosiclare, Ill., which is now operating it. About 80 to 100 tons daily are treated. The acid-grade spar concentrates are shipped to eastern markets for use in the steel, aluminum, and chemical industries.

Value of Colorado's fluorspar production reached a peak in 1944 when spar worth \$1,604,043 was shipped. An estimated production of 20,000 tons of concentrate has been predicted for 1949.

### Dayton Consolidated Mines Active

Dayton Consolidated Mines, Virginia City, Nev., are expanding operations at properties they control in the Silver City section of the Comstock Lode. Power shovels are being used to mine considerable ore from the surface workings of the Keystone property and production is being increased from underground veins developed through the New York shaft. Diamond drilling has been resumed to

locate extensions of orebodies exposed in main workings. About 150 tons daily are being milled, including custom ore produced from a number of properties in Nevada and California, some of which is trucked as much as 100 miles.

The company plans to reopen and operate the Justice, Oest, and other properties, when labor and other conditions warrant. Dayton Consolidated was among Nevada's foremost gold-silver producers before the war halted activities. Its extensive holdings on the Comstock are credited with containing large ore deposits.

### Stibnite Celebration

The mining town of Stibnite, Idaho, recently celebrated the completion of the antimony-gold smelter which has been under construction for the past year. A giant barbecue was held on August 20.

Recently the reduction furnace was fired up for the first test run. When completed, the smelter will be the largest antimony treater in the world. The plant will be capable of processing more than 2000 tons of ore daily, and will be the source of about 90 percent of this country's domestic sup-

ply of strategically important antimony. John D. Bradley, executive vice-president in charge of his firm's Idaho mining operations, said the smelter will have an annual production of 5000 to 6000 tons of antimony.

### Lava Cap Gold Mine

Reopening of the Lava Cap gold property near Nevada City, Calif., is reported to be under consideration by a group from Kellogg, Idaho. They have been advised that it will cost an estimated \$50,000 to rehabilitate the mine which was worked on a large scale from 1934 to 1943, producing more than \$11,000,000 in lode gold. Equipment includes a mill with a capacity of 400 tons a day.

### Underground Compressor Plant

Hecla Mining Co. is installing a large air compressor plant underground at the upper workings of the Star mine at Mullan, Idaho. The plant will eliminate 10,000 ft of compressed air pipe line now in use from the company's compressor plant at Burke. Hecla has recently purchased a number of residence houses in Mullan for the use of employees.

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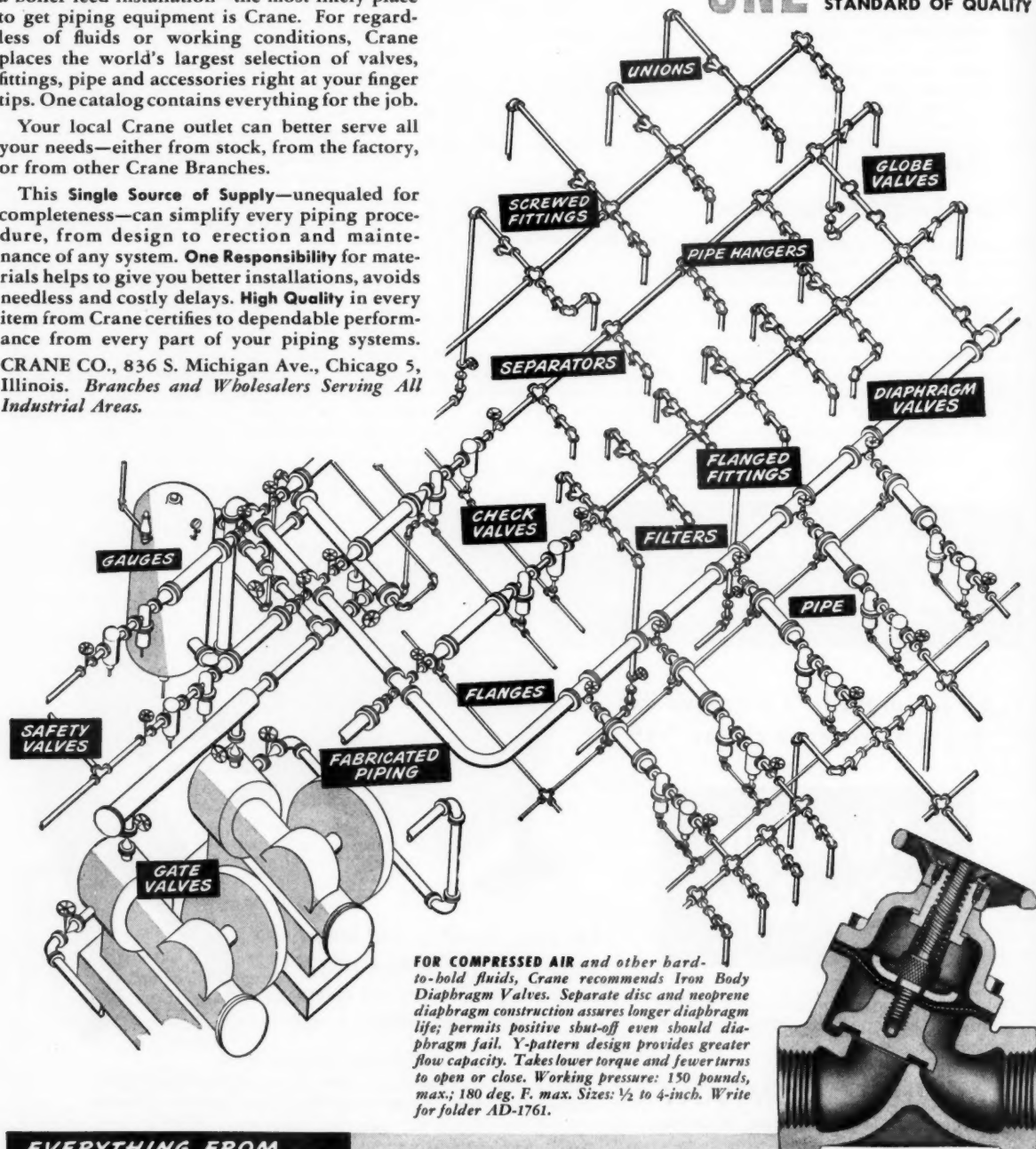
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## Constitution Reaches New Level

Spokane-Idaho Mining Co., operating the old Constitution mine on Pine Creek, Idaho, is now down to the 1400-ft level and is cutting stations on the 1400 and 1200 levels. The company has a modern milling plant and is producing six tons of lead concentrates and 25 tons of zinc concentrates per day. Eighty men are employed.

## Wheels of Government

(Continued from page 64)

ators, remains dormant. This measure would make an amount equivalent to tariff receipts for metal imports available to producers of tungsten, mercury, antimony, and manganese.

## Stockpiling Funds

The Senate has voted to rescind \$275,000,000 in contract authority for the purchase of minerals and metals for the national stockpile, thereby cutting from \$520,000,000 to \$245,000,000 the Government's authority to contract for strategic minerals and metals during the current fiscal year for future delivery. This action of the Senate does not affect the \$565,000,000 directly appropriated for stockpile purchases in the Treasury-Post Office and Second Deficiency supply bills previously enacted. While there is no such rescission in the House-approved Military Funds bill it is anticipated that House Conferees on the measure will accept the reduction made by the Senate.

There was unanimous agreement in the Senate Appropriations Committee that all strategic minerals and materials which are produced in the United States should be purchased here, rather than from foreign sources. The Committee report reads in part: "The Committee directs that the Munitions Board exhaust every possibility of securing the needed minerals and materials in the United States, before looking to foreign sources. The Committee further directs that any foreign contracts entered into in the future should be for a short time and should contain language to allow such contracts to be cancelled, if that becomes necessary."

## Import Duties

The Senate now has on its calendar a bill which would continue suspension of import duties on ferrous and nonferrous scrap through June 30, 1950, and would also restore the 2¢ copper import tax. At Senate Finance Committee hearings August 4 and 5, restoration of the copper import tax was advocated by Senators Hayden and McFarland (Dems.,

Ariz.) and Senator Malone (Rep., Nev.), Sam Morris of the Arizona Copper Tariff Board, and William Lynch of the Calumet & Hecla Mining Co. Opposition was voiced by Norman Hickman, vice-president, American Metal Co.; Simon D. Strauss, vice-president, American Smelting & Refining Co.; Roger E. Gay, president, Bristol Brass Corp.; A. F. Metz, president, Okonite Co.; A. D. R. Frasier, president, Rome Cable Corp., and C. Donald Dallas, chairman, Revere Copper & Brass Co., Inc.

Julian D. Conover, secretary, American Mining Congress, urged the Committee to exclude nonferrous scrap from the provisions of the bill. He told the Committee: "The original suspension of duties upon nonferrous metal scrap, under the Act of March 13, 1942, was a wartime measure intended to stimulate imports of metallic materials then urgently needed for prosecution of the war. The need for such action today has passed. Critical shortages of nonferrous metals no longer exist and the present supply-demand situation is one which is causing serious concern to our domestic producers."

Felix E. Wormser, vice-president, St. Joseph Lead Co., testified that it would be a grave mistake to undermine the tariff protection accorded lead by giving special treatment, or free trade, to one segment of the lead industry, namely, the smelting and refining of scrap material. He said there is no more reason to favor the importation of scrap lead than there is the importation of lead in the form of ores and concentrates, which may also be converted in the United States into pig lead.

## Union Monopoly

The Senate Committee on Banking and Currency has closed its hearings on the monopolistic practices of labor unions, occasioned by the UMWA imposition of the three-day week in the bituminous coal mines. Witnesses appearing subsequent to those discussed in the August JOURNAL include Judge Charles I. Dawson of Louisville, Ky.; A. W. Dickinson, American Mining Congress; J. Carter Fort, vice-president, Association of American Railroads; Donald R. Richberg, former general counsel, NRA; Admiral Ben Moreell, chairman and president, Jones & Laughlin Steel Corp.; and Ezra Van Horn, operators' trustee on the United Mine Workers' Welfare and Retirement Fund.

Judge Dawson declared that labor unions possess a monopoly which has been so used as to seriously threaten the general welfare of all the people. He said this condition has been brought about in part by congressional legislation but also by extreme and strained interpretation given to that

legislation by the Supreme Court, and by the constant support of, and pandering to labor leaders by the Executive Department of the national Government in even their most intemperate demands. He emphasized that it is not only desirable, but necessary in the general public interest that the situation be corrected by legislation.

A. W. Dickinson stated the position of the American Mining Congress, that legislation should be enacted to make the prohibitions of the anti-trust laws again applicable to unions. He called attention to the wide differences in coal mines and in the characteristics of different coal seams and emphasized that operators of coal properties must have complete freedom of management to do whatever is required according to conditions which exist at each mine. He charged that the present monopolistic control and restrictions imposed by union fiat, of which the three-day week is an example, are ruinous to the coal mining industry and confiscatory of the capital invested.

Fort emphasized the highly important place that bituminous coal occupies in American railroad operations and described the harmful effect of the current three-day week and other coal mine work stoppages on rail revenues and expenses, with the resultant idling of coal cars and reduced employment on the railroads.

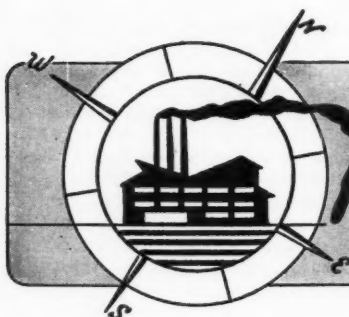
Richberg expressed the opinion that the union-imposed three-day work week is a "clear violation of existing laws." He said he believed that the legitimate activities of labor unions should be defined in the law, and purely monopolistic practices should be excluded from the zone of legitimacy.

Admiral Moreell advocated curbing the actions of large labor organizations by amendment of the anti-trust laws. He saw in the present situation an inevitable drift to compulsory arbitration which he charged would lead to control of prices, production, and eventually result in a controlled economy.

Van Horn told the Committee that for practical purposes the UMWA Welfare Fund has been operated by John Lewis and Senator Bridges "with a total regard of the opinions and views I expressed." He said the administration of the Fund makes the employees the absolute servants of the union and that it sets up the union as a super-government to handle the welfare and social problems that have already been recognized as problems of the State or Government, and for which the employer is already taxed.

As the hearings closed Senator Robertson, the acting chairman, expressed his regret that invitations extended to John L. Lewis, William Green, Philip Murray, and Walter Reuther had met with no response.





# Manufacturers Forum

## Tungsten Carbide Drill Bit

The development of a new Joy Sulmet rock bit, designed for general drilling application, has been announced by the Joy Mfg. Co., of Pittsburgh, Pa. It is a skirt-type bit of the four-point cross design with inserts of tungsten carbide. A variety of sizes are available.



## Color Conditioning

Use of proper paint colors in coal mines and plants to improve visibility and increase safety is recommended in a "Color Conditioning" survey prepared by the Du Pont Co. for the mining industry. The psychological and functional values of colors are considered in making recommendations for painting certain underground areas to step up miners' morale and to promote better seeing. In above-ground areas, specifications are outlined for the efficient use of color to promote good housekeeping and safety.

A 36-page manual, available from the company, covers shaft, slope, and drift mines; mine buildings and offices; homes, churches, stores and schools in mine communities. The booklet deals specifically with equipment of all sorts used in mines.

## Unique Coal-Burning Locomotive

The Norfolk and Western Railway Co. has placed an order for a new type of coal-burning, steam-turbine, electric drive locomotive, to be constructed by the Baldwin Locomotive Works, in collaboration with Westinghouse Electric Corp., and the Babcock and Wilcox Co. The locomotive, rated at 4500 hp, is designed for operation in freight service. The unit will make use of exceptionally high boiler pressure combined with efficiencies inherent in the steam-turbine electric drive to

produce an over-all thermal efficiency which will cut fuel costs to far less than those for conventional reciprocating steam locomotives.

## Geiger Counter

The Nucleonic Corp. of America, Brooklyn, N. Y., has announced the development of a low cost, portable, light weight radiation detector for use in the search for radioactive ores. The instrument may be clipped on to the prospector's belt allowing freedom of both hands. The battery-operated unit is reported to be sensitive to minute amounts of radioactive ores. Clicks in an earphone and a flashing light indicate the presence of radioactivity.

## Storage Battery School

In order to help industry to get more efficiency and life from storage batteries, the Gould Storage Battery Corp., Trenton, N. J., will hold its second course in the current school series. The industry is invited to send battery maintenance supervisors, mine foremen and others who are daily engaged in the care, maintenance, and

operation of storage batteries and battery operated equipment, to a five-day school on the care, maintenance, and charging of the storage battery.

This year's course will be held November 14-18 at Gould's Trenton plant. Interested parties are invited to write to J. A. Gilruth, School Director, Gould Storage Battery Corp., for a bulletin describing the contents of the course and giving other detailed information.

## Forged Roof Bolt

The Cleveland Roof Bolt Co., Cleveland 6, Ohio, has developed a forged roof bolt which utilizes a forged steel wedge. Bolt and wedge are designed for simplicity and easy insertion and for self-centering in the slot. Specifications for the roof bolt are set up to avoid failures by utilizing cold rolled threads, by forging the bolt, and by using selected quality steel.

The self-centering wedge is constructed for easy starting in the slot and is forged with a head to avoid any possibility of the wedge head penetrating soft strata at the bottom of the hole.



Members of Mine Inspectors Institute examine a Faceduster in a tour of Mine Safety Appliances Co.'s Pittsburgh plant





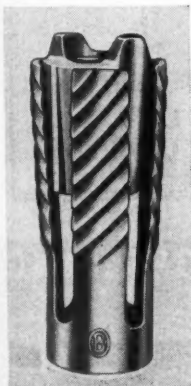
A Model FFD tandem axle Euclid stripping overburden at the Douglas mine of the M. A. Hanna Co., Chisholm, Minn., is powered by two General Motors Diesel engines

### Heavy-Media Separation

The Southwestern Engineering Co. reports that factory-built Heavy-Media Separation plants will be prefabricated in the company's factory in Los Angeles. The units will be made in 100 tph and smaller sizes. The plants incorporate Akins separators for the separatory vessel and produce a middling product in one operation and in a single cleaning circuit. Wilfley pumps and Dings "HM," Crockett-type magnetic separators are incorporated in the design. Either Allis-Chalmers, Roberts, or Simplicity screens can be used.

### Expansion Shell for Roof Support

The Ohio Brass Co., Mansfield, Ohio, is now producing expansion shells and plugs for anchoring threaded rods or headed bolts with bearing plates in roofs. The design is said to offer greater expansion and holding power. Additional information can be obtained upon application to the company.



### Analytical Balance

For weighing ore samples to  $\frac{1}{20}$  of a milligram with analytical balance accuracy, but in considerably less time, the Fisher Scientific Co., Pittsburgh, Pa., has designed a new direct-reading instrument called the "Gram-atic Balance."

The balance has only one pan and

the weight is read directly on a scale at eye level. No weights are handled in the operation of the balance but weights less than 0.1 gram are indicated optically and automatically. The new balance is said to be ideal for production plants and mine laboratories.

### — Announcements —

The Jeffrey Mfg. Co. of Columbus, Ohio, and the Sunnyside Coal Co., Pittsburgh, Pa., have formed a jointly-owned Ohio corporation named The Colmol Co. to develop the "Colmol." C. H. Snyder, president of Sunnyside, will also be president of the new corporation.

Three organizational changes in the Ohio Brass Co., Mansfield, Ohio, were recently announced. Merrill W. Manz has been designated vice-president; Roger A. Black has been appointed general factory manager; and H. E. Shoemaker, has been named manager of the foreign trade department.

C. W. Higbee, manager of the wire and cable department, U. S. Rubber Co., announced the appointment of Howard H. Weber as general sales manager for the department.

B. E. Pheneger, Duluth district manager of operations for the American Steel & Wire Co., has been appointed assistant to the vice-president of operations with headquarters in Cleveland. L. J. Westhaver succeeds Mr. Pheneger in Duluth.

Fulton Bag & Cotton Mills, Atlanta, Ga., has announced that George W. Williams is the new manager of the Dallas, Texas, plant. He succeeds Adolph Mayer who died recently. Mr. Mayer had been associated with Fulton Bag for over 50 years.

### Catalogs & Bulletins

**BATTERY SELECTION.** Gould Storage Battery Corp., Trenton, N. J. To guide purchasing agents, superintendents, engineers, and section foremen in selecting correct batteries for mine service the company has published a two-color, eight page catalog announcing the new "Z" plate construction and showing the construction of the Gould "Thirty" and "Kathode" batteries. Included in the catalog are two pages of engineering specifications for almost 100 different size and capacity batteries. Data includes the number of plates per cell, ampere hour and kilowatt hour capacity at six and eight hour rates, discharge in amps at the six hour rate, recommended finishing charge rate, cell dimensions, and other important information.

**BAUM JIG WASHERY.** McNally-Pittsburg Mfg. Corp., Pittsburg, Kans. This new bulletin describes a unit-type Baum jig washery designed for small tonnage operations. The unit includes a washer, settling tank, and recirculating water system. The ready-built unit is delivered complete for assembly. Capacities run from 30-90 tph. The washer is available in four different basic units, selected in accordance with the size range and tonnage of the coal to be cleaned. A descriptive bulletin will be sent upon request.

**CENTRIFUGAL PUMPS.** Allis-Chalmers Mfg. Co., Milwaukee, Wis. A revised handbook on the care of all makes of centrifugal pumps has been released by Allis-Chalmers. The 16-page bulletin gives the how and why of pump construction and their effect on pump maintenance. Information is presented on figuring heads and tables are presented which help determine total friction loss. The cause and cures for various sources of trouble are offered along with a new maintenance time table. Copies of handbook are available upon request from the company.

**HEAVY MEDIA.** Western Machinery Co., San Francisco, Calif. Publication of a new bulletin, "WEMCO Equipment for Heavy Media Separation" was recently announced. The booklet is of particular interest to the coal and mineral engineering industries as it offers an illustrated discussion of the application, design, and operating characteristics of HMS equipment. Copies are available upon request at any Western Machinery Co. office.

**HIGH SPEED LOADING.** The Euclid Road Machinery Co., Cleveland, Ohio. A new 24-page book entitled "Euclid Loader for High Speed Loading of Large Hauling Units" pictorially presents the application of a variety of earth moving equipment handling high capacity loads. Copies may be obtained from Euclid distributors or from the main office.

**MILLISECOND DELAYS.** Atlas Powder Co., Wilmington, Del. Millisecond delay blasting is discussed in detail in a new 20-page booklet, "Rockmaster 16 Blasting System." Included in the booklet are 20 sketches of typical drill-hole and detonator lay-outs, for the various types of blasting service where millisecond delays are employed. The Atlas development of a series of 16 Rockmaster electric detonators designed to fire at milli-second intervals, with the entire group firing at 550 one-thousandths of a second, are discussed. The company's main Wilmington offices or branch offices will supply the booklet on request.

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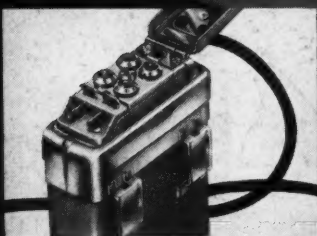
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